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CONTENTS

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AVIATION AND COSMONAUTICS

No 11, November 1988

AF Political Chief Urges Greater Perestroyka Effort

91441105a Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 1-3

[Article by Col Gen Avn L. Batekhin, Military Council member, chief of Air Forces Political Directorate, delegate to the 19th All-Union CPSU Conference: "Following a Path of Revolutionary Renewal"]

[Text] As they celebrate the 71st anniversary of the Great October Revolution, military aviation personnel turn back again and again with their heart and memory to the historic events in that distant year 1917, which heralded the beginning of a new era in the history of all mankind.

The grandeur of the deed accomplished by the worker class, the working peasantry and the revolutionary-inclined soldier masses during those days in October, under the leadership of V. I. Lenin and the Bolshevik Party, is keenly perceived by us with profound understanding from the vantage point of subsequent decades and from an awareness of the revolutionary changes which are presently taking place in this country, in the party, in the Armed Forces, and in military aviation.

Today's reality, just as the entire history of our Soviet state, confirms that it is not easy to march along unbeaten trails, particularly for he who leads the way.

But the revolution has not been completed. It is continuing in perestroyka, in the deeds and thoughts of the present generation of Soviet citizens—workers and members of the military. We are at a turning-point stage in history. "The coming years will determine the future of our country, the fate of the Soviet system," noted Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, at the 19th All-Union Party Conference. "For us this future will be what we make it. We ourselves—nobody for us or in place of us."

The Air Forces have also entered a qualitatively new period of development. The "Wings of the People," as V. I. Lenin called the Red Air Force, are indeed experiencing a second birth.

The modern aircraft in service with Air Forces units possess extensive tactical performance capabilities. Analysis of development trends in military aviation abroad, views on its combat employment, and the experience of pilot-internationalists with the limited Soviet forces in the Republic of Afghanistan, in exercises and tactical maneuvers substantially influence changes in Air Forces operational art and tactics and in organization of combat training of personnel and party-political work.

Implementing the recommendations of the conference resolution entitled "On Progress in Implementing the Decisions of the 27th CPSU Congress and Tasks Pertaining to Extending Perestroyka," commanders, political agencies, party and Komsomol organizations of air combined units and units, Air Forces higher educational institutions, enterprises and establishments are concentrating their efforts on consistent implementation of the party guideline dealing with focusing defense organizational development toward predominantly qualitative parameters and guaranteeing reliable security of the Soviet State and its allies in strict conformity with our defensive doctrine.

This demand is being implemented by means of technical improvement of the Air Forces, enhancement of the role of military science, and improvement of the force composition of the Air Forces. New approaches are being confirmed in high-quality performance of combat training tasks, in restructuring of the system of command and control and organization of training of aviation personnel, in renewal of the content, forms, and methods of party-political work, and in a decisive shift toward work with individuals.

Since only the first steps are being taken on the road toward Air Forces transition over to predominantly qualitative development parameters, it is obviously premature to talk about results and achievements. But we already know of units, military educational institutions, enterprises, political agencies, and party organizations which have set about in a businesslike manner, without slipups, carrying out the tasks for the Air Forces proceeding from the resolutions of the 19th All-Union Party Conference and the decisions of the July (1988) CPSU Central Committee Plenum. These include the units in which officers A. Bokach, A. Merkulov, V. Malinnikov, V. Budko, and V. Grebennikov, officer-political workers V. Konev, A. Tregubov, and V. Tarubarov serve, and the party committees in which officers V. Vorobyev, N. Dukhnovskiy, and V. Rudnev, delegates to the 19th All-Union CPSU Conference, serve as secretary.

We are not exaggerating the work of the party members and military aviators of these collectives, for conscientious performance of military and party duty and fulfillment of the requirements of guideline documents is our obligation. Good initiative is always important, however. This includes example, experience, know-how, and lessons for ourselves and others.

What trends and phenomena are most typical of Air Forces outfits at the present stage of perestroyka? We have succeeded in pushing back attitudes of complacency and all-forgivingness. Everywhere people's receptivity to the new demands and boldness in the campaign against shortcomings are growing stronger. Military aviation personnel are showing more desire to take part in managing the affairs of military collectives and workforces. Communists have gone to party committees at their own initiative and have become more demanding

on leader personnel and on activists. Indifference toward political affairs is disappearing. A new historical consciousness and contemporary military-political thinking are taking root.

The political section in which officer A. Alekseyev works can serve as an example of persistent efforts to master political methods of leadership and new approaches to accomplishing combat training and indoctrination tasks.

What is characteristic of the work style of this political agency? First of all, profound conclusions have been drawn from the mistakes of the past years, and steps have been taken to prevent them from being repeated. Critical assessments of the local realities have become a standard of military and party affairs here.

Specific leader-Communists are being held strictly accountable for specific shortcomings. The administrative staff is now functioning better. The political workers spend only one fifth of their time on political section internal needs. They spend the rest of the time on organizational and political work directly in the subunits. Also important in my opinion is the fact that matters pertaining to improving combat readiness, flight safety, and strengthening military discipline are being resolved by the political section primarily by strengthening party discipline and ensuring personal exemplariness by party members in performance of duty, in combat training, and in off-duty activities.

Joint efforts by commanders, political workers, party and Komsomol organizations have enabled the collective greatly to improve the state of military discipline. In this unit they have virtually eradicated attempts to shirk duty, malicious treatment of others contrary to regulations, and infractions involving drunkenness. Purposeful efforts to improve military job safety and to protect the life and health of personnel have been very effective.

Strengthening of military discipline and order is beneficially affecting improvement in qualitative indicators of combat readiness, aviation personnel flying proficiency and overall military proficiency as well as the moral-ethical microclimate in the collective.

Another reason this example is important to us is the fact that it persuasively demonstrates that the task assigned by the CPSU Central Committee and USSR Minister of Defense pertaining to achieving a radical turning point in the state of military discipline is a realistic task and therefore achievable.

Political agencies have definitely strengthened their influence in priority areas of Air Forces development. We must state quite frankly, however, that changes in the work style of many political agencies are insignificant to date; they are failing to break away from the obsolete ways and are unable to serve as an example of perestroyka for party members and all Air Forces personnel.

Proceeding from the resolutions of the 19th All-Union CPSU Conference, in what respect does the present work style of political agencies lag behind the pace of restructuring? I believe that it is insufficiently focused on the end result. Hence its lack of productivity and its in many cases weak political influence on the course of restructuring in units, at military educational institutions, enterprises and establishments. A bureaucratic attitude has not yet been eradicated. After the conference many elements in the work style of political agencies (and not only them) ceased to conform to the new content of socialist democracy and changes in the political affairs of society.

Until recently it has been possible for us to find a "golden mean" between the new demands and old approaches, work forms and methods. Now the political situation is radically different. And he who today fails to alter his work style will tomorrow be forced to bow out, to put it mildly. Our military aviation personnel are aware of the increased powers of party organizations and the community at large and are already applying them in a practical manner.

The party committee headed by Communist A. Starchikov decided to relieve him of his duties as secretary for inability to direct the party committee in conditions of restructuring and democratization of military and party affairs. Not a run-of-the-mill occurrence, but indicative in the respect that this can happen to a person who is unprepared and who does not possess the necessary qualities of party leader.

This was not a sudden party committee decision. It "ripened" over the course of two years. And Starchikov himself was unquestionably to blame in part. But it would also be fair to criticize the leader-Communists and political section officers who knew about the unhealthy situation but failed to take the necessary steps in a prompt and timely manner.

There is a single conclusion from the above: political agencies should ensure an adequate level of political leadership of the restructuring process. I would assume that additional commentary on this point is not needed.

In what fundamental areas does it seem necessary to intensify restructuring of the work style of political agencies pursuant to the resolutions of the 19th All-Union Party Conference, the decisions of the July (1988) CPSU Central Committee Plenum, and the points contained in the Krasnoyarsk speech by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, as well as at the meeting at the Party Central Committee with senior officials of the mass media, ideological establishments and unions of the creative professions?

A paramount task is to master a clearly-defined style of political leadership. This is directly demanded by the conference resolutions on a radical reform of the political system, on party assumption of the role of political vanguard of perestroyka, and on demarcation of the functions of party, soviet, and governmental bodies.

In contrast to party rayon committees, more typical of military political sections, including ours, is not replacement but rather redundancy of executive and command functions, although this does not change the substance of the matter. And the harm from duplication is threefold, since the functions of political leadership are "cast adrift." Commanders and headquarters staffs, relying on the political workers, lessen their organizational and administrative efficiency, while political agency officers in turn sometimes lose the role and skill of political leaders, indoctrinators, and propagandists.

There is no question that the end aims of political agencies are identical to those of the administrative activities of command personnel. These include assimilating the qualitative parameters of improvement in combat readiness, achieving a qualitatively new level in personnel flight training and combat training as a whole, and radical resolution of the problems pertaining to ensuring flight safety, and a radical turning point in the state of military discipline. But at the same time political agencies should perform their own job functions and operate with their own methods. It is precisely this which many currently are lacking.

I believe that one should begin here with clarification of one's political functions and methods and with a search for a new mechanism of carrying them out. It is necessary that each political agency, while employing the same general approaches, have its own special signature, its "school" of political influence and leadership, figuratively speaking.

The Air Forces Political Directorate is currently engaged in study and development of a system of views on political methods of leadership taking into account the specific conditions of the Air Forces. In the near future we plan to discuss at conferences of political agency chiefs the results of the work which has been accomplished. But this by no means signifies that one can wait for instructions and recommendations from the higher echelon.

There are no universal recipes which can be applied in every case. Creation of an effective mechanism of restructuring work style is a matter of practical activity, to be done by the political agencies themselves.

One can see that the demands of party members and all personnel on political workers and party activists are increasing day by day, and this is natural, since political agencies are at the center of the revolutionary reforms of the entire political system. This process is grounded on rebirth of the Leninist concept of the party as a politically (but not across the board) leading vanguard. The laboratory in which this process will take place and is already taking place is each military aviation collective, each party organization, life itself, as regards the larger picture. All of us need to learn correctly to perceive the lessons of this best teacher of perestroyka. Particularly since life experience helps us find answers to some practical questions, including the following: where should we begin in restructuring the work style of political agencies?

First of all, I believe that we must learn skillfully to manage the process of ensuring a vanguard role by party members. Today this role serves as the principal criterion for restructuring political agencies and party organizations. If I were asked what is the most important thing in party work, I would reply: just as improvement of a pilot's flying and combat proficiency is the main task of flight training, improvement of a Communist's party qualities is the main thing in party work. We cannot influence the people in our collectives or the results of their labor other than through party members. This idea sounded repeatedly at the conference and at the July (1988) CPSU Central Committee Plenum.

Unfortunately work in this area is improving very slowly. Take, for example, Air Forces higher educational institutions. Only one fifth of the schools' party organizations are ensuring a vanguard role in discipline by each and every party member. At Air Forces higher educational institutions in the Siberian Military District one out of every ten Communists has received party punishment. CPSU members at schools in the Urals and on the Volga are not becoming more active in military scientific and efficiency innovation work. Only one third of party members at the Yeysk, Chernigov, Chelyabinsk, and certain other Air Forces schools are properly working on improving training facilities and improving facilities at military posts.

This situation is due in large measure to the fact that political agencies and party organizations allowed things to drift aimlessly. But the situation is correctable. This is confirmed by the experience of our best collectives at military educational institutions, where already today 70 percent of permanent-staff party members are excellent-rated in combat and political training and have on their records no gross violations of regulations, flight rules and procedures. One out of every two party members at these schools are actively engaged in productive scientific and technical work, and 40 percent of party members are involved in party committee and party buro activities.

Such results can be achieved with desire and ability. We now have the task of boosting all party organizations up to the level of the present leaders in this coming year.

What must be done first of all? We must without delay put an end to failure by political agencies adequately to appreciate the primary party organizations and their

inadequate attention toward these organizations. It is high time for them to stop stewing in their own juice or, even worse, being "under the heel" of the commanding officer or political worker. Party organizations should be able to do their principal job—improving the party qualities of every Communist. And this requires radical restructuring of their activities in almost all areas. Hence the necessity of political sections mastering the style of daily guidance of primary party organizations, and we mean daily.

Some political agencies are still hindered in doing their job by their insufficient independence and excessive scattering of manpower. We see as a solution to this a firm demarcation of the functions of the political sections and administrative staff of combined units, higher educational institutions, and units. Of course it is necessary to take part in the general activities of command elements. But this should involve only from 5 to 10 percent of one's time. The rest of the time should be spent on independent work by political sections involving exercise of party-political leadership.

It is also necessary to change approaches in personnel work. In an article entitled "Qualitative Parameters of Defense Organizational Development," published in the newspaper KRASNAYA ZVEZDA, CPSU Central Committee Politburo candidate member USSR Minister of Defense Army General D. T. Yazov stresses: "Accomplishment of the tasks of qualitative improvement of the Armed Forces imposes special demands on competence on the part of personnel and their ability to operate in conditions of democratization and glasnost, to find new, innovative approaches to the problems of military life—from combat readiness to social-cultural matters and everyday life...."

It is important to remember that the political agency is fully responsible for correct implementation of party personnel policy. Its functions should not be limited to participation merely in settling specific personnel matters.

A political agency should more frequently and thoroughly analyze, at meetings and conferences of party activists and in primary party organizations, current problems of work with cadres. The political section should exercise much greater influence on the personnel agency. It is essential to increase the responsibility of party organizations for working with individual candidates for advancement, for objectivity of evaluations and for effectiveness of assistance to newly-appointed leader-Communists.

A primary present task is organization of reeducation of all our cadres in a spirit of perestroyka. Military aviation personnel must be helped to understand its general concept, its social and psychological aspects, specific focal areas in the Air Forces, the essence of reforms in working with personnel, in the area of command and control, etc.

I should also like to mention the need to seek new forms and achieve more democratic resolution of cadre matters. Although a decision on these matters is always the commanding officer's, the political agency and party organization are entitled, before giving a party character reference for a given party member, to study the opinion of this individual's comrades and the collective. In the final analysis they are also entitled to compare him with other candidates for promotion or reassignment. Many political agencies are already proceeding in this manner, and the majority of commanding officers perceive this not as "undermining" their power and authority but rather as concern for ensuring that they make the right decisions.

A most important area of restructuring in the activities of political agencies and party organizations is the forming and shaping of a work style which produces good end results. Today passivity and aimlessness are the principal flaws in this area. Fairly frequently the situation develops as follows: people from the political section have visited the unit, noted shortcomings, and have mentioned this in a critique and analysis session. But they have failed to organize efforts to correct these shortcomings, have failed to present an incisive political appraisal, and have taught people nothing with this example.

It is essential to realize once and for all that the main task of the political section when working in the units is to get the activities of political workers and party organizations going. Political agency officers should, figuratively speaking, share their life, share their concerns, and take a personal interest in working together with them correcting their deficiencies. The effort should not be a broad, all-encompassing one. Attention can be focused on some one item. But one should address it in a persistent manner, keeping with the effort and mandatorily achieving a tangible improvement. I believe that it would be correct to make each worker specifically responsible for the state of affairs in some one area, in one specific subunit or unit.

One should also work on mastering a proper style of planning end results. Not study of abstract problems but a plan and schedule of measures which help reach the end results—this is what we need today.

I would say that there is one more acute area of perestroyka—independent forming of democratic leadership style by political agencies. It is necessary clearly to see the center of the processes of democratization. These include the primary party organization and the primary military collective. In these bodies it is high time to revive and enliven democratic institutions and forms which in some units have been forgotten or even discarded as valueless. These include all kinds of councils, volunteer commissions, meetings, courts of honor, public oversight groups, etc. Right now these bodies are in great need of Communists with fighting qualities. The

task is to find such people, help them become established, and force command personnel to listen to their opinion in that area for which they have been given responsibility.

The resolutions of the 19th All-Union CPSU Conference contain considerable potential in ideas on reviving the spirit of Leninism in intraparty relations. They must be boldly implemented in conformity with the specific features of our military environment. Political agencies should confer more frequently with party organizations, ask them questions, and respect their opinion. It is essential to guard the right and obligation of a party member to criticize and to respect his opinion. Party committees and party buros should be held strictly to account for every suggestion by a CPSU member which has been ignored or unwarrantedly rejected. It is our ideal for the party member to settle everything in the primary political agency and in the party organization. That is the way things are, for example, in the party committees in which officers V. Guzevatyy and V. Plotnikov work. But a great deal remains to be done in this area.

These are some of the priority problems we must resolve in the course of practical implementation of the demands of the 19th All-Union Party Conference and the July (1988) CPSU Central Committee Plenum. There are certainly more such problems, for we are not talking about carrying out two or three measures but rather a comprehensive reform of the work style of Air Forces political agencies and party organizations.

Enormous work lies ahead, work which is more complicated than in the past. The path from crisis to normalization of the domain of party relations, from lip-service to genuinely party-minded leadership will not be easy. And in this connection the following Leninist statement made at the closing of the 11th Party Congress is being perceived keenly and in a contemporary manner: "Today the entire point is to ensure that the vanguard is not afraid to work on itself, to make changes, and openly to acknowledge its insufficient preparedness and inadequate ability."

I believe that Air Forces political agencies and party organizations will display boldness, character, and the desire to learn to work in the new manner, in order to make each and every party member and member of the Air Forces an active participant in perestroyka, a worthy successor and continuer of the cause of the Great October Revolution.

Improving Coordination Between Troop Lift Aircrews and Air Assault Troops

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[Article, published under the heading "Great Vigilance, Constant Combat Readiness," by Capt S. Prokopenko: "Before Battle Is Joined"]

[Text]

Key Element of Success

At a tactical air exercise the helicopter crews of the element under the command of Maj A. Astashkin would be working with an air assault subunit. Delivery of a tactical air assault force was to be the high point of the exercise. While reconnoitering the objective area, the pilots selected a site which in their opinion would permit landing the entire element.

At the designated time the helicopters proceeded to the assault airlift staging area, where the assault troopers were waiting. They commenced boarding. Major Astashkin summoned the assault force commander and pointed to the landing site on the map.

"Things are going to be pretty warm wherever you set us down," the assault element commander joked, and then added: "I believe it would be better if we moved the landing site forward about 200 meters. It would be more advantageous for us to deploy and engage from this point."

The lift element and assault element commanders discussed this alternative plan and, using the map, chose a landing site. It was out of range of "hostile" fire and at the same time provided capability to move swiftly and unobserved toward the adversary's FLOT.

They proceeded as planned. They put down by a small creek. The assault troopers quickly disembarked from the helicopter, proceeded unobserved to the designated point, and attacked the "adversary" before the latter could initiate action, which contributed to the success of the overall engagement.

This example once again confirms how important precisely-organized coordination is—in missions, objectives, and time—in modern combat. It would seem to be a trivial matter—just 100-200 meters—but at that moment they proved to be determining in the outcome of the combat engagement. This is what we mean by considering in advance the fine points of airborne assault.

Our helicopter crews have amassed considerable experience in organizing coordination with ground subunits in the course of performing mock combat missions. This know-how has been considerably enriched by crews

which have performed their internationalist duty in the Republic of Afghanistan. Taking this into account, we shall endeavor to show how coordination was organized in the course of combat operations.

Upon receiving orders to assign personnel and equipment to support combat operations, subunit commanders would determine capability to accomplish the mission on the basis of number of combat-ready helicopters in good working order and, accompanied by the squadron navigation officers, would visit the units which they were to support. Working jointly with the ground commanders, they would determine the landing zones, number of air assault troopers per helicopter and the required number of troop lift runs, would ascertain the last names of the element leaders and determine trooper helicopter assignment, and would work out the map coding, communications procedures and radio callsigns of the tactical air control party and forward air controllers.

Only after this would they mission-brief the aircrews. The pilots and navigators would prepare their route charts and add the coding used in the air defense system. Communications channels, callsigns of airfield, tactical air control party, forward air controllers, airborne communications relay station, and search and rescue aircrews would be communicated to all appropriate personnel.

They calculated with particular thoroughness departure time and operations kickoff time for the various tactical elements: the assault element, escort element, and air defense suppression element, as well as search and rescue aircrews—and they specified enroute flight level to and from the objective as well as enroute formation. The assault element lift pilots were briefed on the number of assault troopers they would be carrying and the name of the designated leader, which shortened the time required to load troops in the assault airlift staging area. There was one more item as well. The assault troops arrived in the troop pickup zone not later than 1 hour prior to departure. At this time each element received a final briefing, joint action variations, procedure and sequence of landing, and rehearsal drills were conducted.

Matters pertaining to organization of coordination in fire support of ground subunits were worked out in detail. A great deal here depended on the forward air controller's ability to work with the helicopters, for it would sometimes happen that, due to inexperience or in the heat of battle, FACs would lose their bearings and there would arise the danger that aircraft would place fire on friendly troops. For this reason the following fire delivery procedure was worked out in the course of combat operations: an aircrew would radio the FAC to mark his position with smoke, after which he would indicate bearing and range to target relative to his position. A brief rocket salvo would be placed into that location. The main strike would be delivered on the basis of FAC adjustments to target location in relation to the bursts.

Maneuver by aircraft was fairly extensive during the period of combat operations. All aircrews were constantly ready for a situation change and redirecting or retargeting while airborne. As a rule, in addition to the primary mission, secondary missions were performed: to put down somewhere, pick up and airlift troops to another location, etc. These missions were performed well due in large measure to uniform coding and uniform symbols. In addition the aircrews as a rule remained constant. And the helicopter crews, forward air controllers, and fighter-bombers got so that they recognized one another by their voices. This strengthened mutual understanding and coordination, which contributed greatly to the success of the exercise.

Aircrews endeavor to apply experience acquired in Afghanistan to present activities in the course of combat training. A tactical air exercise conducted by the squadron under the command of Maj N. Nelipovich can serve as an example. The helicopters would be firing rockets at night with a mortar battery providing target illumination.

A night strike on targets illuminated by ground weapons is a difficult task. Its success depends in large measure on the degree of coordination established between helicopter crews and ground subunits. Therefore on the eve of the exercise the squadron commander and executive officer met with the commander of the combined-arms subunit and the range officer of the mortar battery which was to provide illumination fire. The officers detailed the rate and direction of fire, height and trajectory of illumination rounds, burning time, and direction of helicopter attack. It was determined that optimal conditions for target detection would be at a height of 100-150 meters above or 50 meters beyond the target. Therefore in calculating the point at which to give the command to commence illumination fire, it was necessary to figure in the time required for a flare to descend to the specified height, that is, timed to the moment of helicopter approach to the specified distance to target. In order to adhere precisely to the illumination schedule and to ensure a safe firing interval, a forward air controller was assigned to assist the range officer.

When dusk had fallen over the airbase, the helicopters proceeded to take off in pairs. In order to make maximum effective use of target illumination time, it was decided to hit the targets one helicopter at a time, with distance between sequentially-attacking helicopters specified in advance. The plan was successful, and the helicopters delivered an accurate rocket attack on the "enemy."

Cost of a Mistake

"Our two-ship element was given the mission of delivering two assault elements which were to deploy astride a road and intercept a caravan with weapons and ammunition entering the country from Pakistan," related Maj A. Astashkin. "Getting together with the air assault

people, we discussed the details of the forthcoming mission and designated on the map landing sites located about 500 meters back from the road on both sides. We also worked out a plan variation to follow in case we spotted the caravan while approaching the objective. We decided that we would hit the vehicles and then land the air assault troops right by the road. I asked the assault element commander whether in this situation we should wait for them. He replied with extreme clarity: "We shall remain in any case!"

As we were approaching the objective we spotted vehicles on the road. The men followed the prearranged plan: we hit the caravan and then proceeded to land. But it proved impossible to set down on the road, as the road at this point was pinched in a cleft between mountains. We found a suitable site about 200 meters from the highway. Disembarking, the assault troopers immediately engaged the bandits. A heavy exchange of fire commenced, and Astashkin had to taxi forward to a point where a small hillock sheltered the aircraft from dushman [mujahideen] fire. He radioed his wingman to land his assault troops. After some time a messenger ran up and communicated a request from the commander of the air assault element that they bring the helicopters over so that they could load aboard weapons captured from the mujahideen. The major instructed him where to assemble all the captured arms and stated where it would be best to do the loading. He asked the messenger to obtain more detail from the ground force commander on his subsequent plans.

When the weapons were loaded, the messenger again appeared.

"We're remaining here!" he communicated the assault force commander's decision.

It was dusk when the helicopters took off. After they had climbed to 500 meters, the crew chief reported that assault trooper combat field packs carrying ammunition and rations had been left on board, forgotten by the troopers in their haste. Astashkin's throat tightened: if the ground force were left without ammunition and food, it could fall easy prey to the mujahideen. What should he do? He reported the situation to the command post. The senior commander ordered him to proceed to base, reassuring him that the ammunition carried by the assault troopers would be sufficient to hold out until morning if they were forced to engage the enemy.

"You can drop it in the morning!" he added.

Apprehension kept them from sleeping that night. The following morning they received orders to go out and look for the ground assault element. This only heightened their uneasiness. The assault troopers had failed to arrive at the designated assembly point. Later a report was received from an Afghan outpost that the entire element was at that location.

"That was a real weight off our shoulders," related Major Astashkin. "But we still have a bad taste in our mouths, for the lack of coordination in our actions could have cost lives. It was by pure luck that there were no casualties."

Combat is the main criterion in judging the maturity of commanders at all echelons, their ability to lead their men, and their command qualities.

At a certain tactical air exercise Capt P. Zaytsev, commanding a helicopter element, was assigned the mission of landing a tactical assault force behind "Northern Force" lines. They prepared thoroughly for the mission, and at the designated hour the helicopters headed for the objective area. Executing the required maneuvers, they reached the landing area and landed at the predesignated site. Within a minute the entire assault force was "destroyed" by "Northern Force" tanks. It was ascertained that enemy reconnaissance had spotted helicopters during preliminary reconnaissance, when a suitable landing site was being selected....

During the next phase of the exercise the helicopter crews operated on the side of the "Northern Force." Once again they had to land an air assault force behind "aggressor" lines. They proceeded with preparations for the mission: in the course of preliminary reconnaissance they selected a suitable landing site and even tested it out. At the designated time they took off with the air assault troops on board. Having learned a bitter lesson, however, they landed at another site, which they had also noted during preliminary reconnaissance. As was later ascertained, this precautionary measure had been wise: the "Southern Force" had moved several tank subunits into the phony landing site area. But this time it had been a wasted effort....

Submerged Rocks

"In Afghanistan we got so well acquainted with the helicopter crews that prior to a mission we ourselves would request a specific helicopter," related Sr Lt S. Kulikov, deputy commander for political affairs of an air assault company. "We would have the helicopter crews come over for a mission briefing. Sometimes we would work through almost until morning, figuring how to get the force to the objective quickly and unobserved. This created an atmosphere of mutual trust and a feeling of fellowship. We were confident that in any situation the helicopter crew would do right by us. Here at home, in peacetime conditions, there are considerably more opportunities to organize such close coordination. It is paradoxical, however: we see a crew only when we board their helicopter. And yet the value of coordination is counted in lives."

Similar opinions on the level of organization of coordination during performance of mock combat missions were heard from many air assault and helicopter personnel.

What is the problem? After all, these matters occupy an important place in the decisions and plans of commanders and staffs taking part in an exercise, and they are worked on rather meticulously. But these instructions are communicated in a fairly simplified manner to the immediate executing personnel. For the helicopter crews, for example, it is pick up such-and-such troops and transport them to such-and-such a place, and for the air assault troopers it is board such-and-such a helicopter, land at such-and-such a location, and proceed as per plan.... Does this approach leave any place for independence and initiative on the part of either party? Hardly. For this reason the helicopter crews sometimes have only sketchy knowledge of the missions of the subunit for the benefit of which they will be operating.

In a conversation with Sr Lt S. Kulikov I asked him whether any of his men—primary-rank enlisted personnel or NCOs—could guide the helicopters to the objective if it became necessary. The officer replied unequivocally: no. Some might assert that there is no need for this. Experience in Afghanistan, however, demonstrates otherwise.

What is the reason for this? Many people I have talked to are of the opinion that the reason lies in insufficiently precise coordination between the combat training schedules of aircrews and air assault personnel. What happens sometimes? A training sortie involving insertion of a reconnaissance team behind "enemy" lines, for example, is added to the training schedule. At the designated time the helicopter takes off, executes the cross-country flight, lands, and then returns home. In other words, air is conscientiously providing airlift services. But at the same time, somewhere not far off, an air assault subunit is working on a similar training topic, using the "walking-it-through" method. Actions geared to show and pretense and unnecessary situation simplification in training lead to such absurdities.

It seems to me that an important role could be played by combined training drills, such as helicopter loading and disembarking, for it sometimes happens that during a field exercise a troop element is boarded and dozes off during the flight, and then at the destination point the troops totally lose their bearings. This is a waste of valuable time, and the troops are more likely to be destroyed by the "enemy." The element leader could step into the cockpit upon approach to the objective area, and the pilot could give him his bearings, pointing out the forward line of own troops, etc. This is frequently not done because some air assault troops leader personnel lack the requisite meaningful contact and mutual understanding with the troop lift aircrews.

...The process of perestroyka taking place in this country is also reflected in the military. First and foremost it affects people's mood and attitude, their desire to work at full effort and to see the actual results of their military labor. There is occurring a broadening of initiative, and there is an increasingly implacable attitude toward lack of originality, predictable pattern and routine, and unnecessary situation simplification in organization of the training process. But the mechanism of foot-dragging is still strong and is continuing to impede our movement forward toward the heights of combat proficiency. The negative examples cited in these comments are evidence of this. There is only one solution: to declare war across the board on unnecessary situation simplification and a lip-service attitude in combat training.

Review of Soviet Defense Minister's Book on History of Russia's Military Forces

91441105c Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 8-9

[Book review, published under the heading "New Books," by Col N. Shakhmagonov: "Succession of Generations"]

[Text] "Considerable G-loads, cramped cockpit, a continuous, heavy flow of information, and an intensive work pace—all this makes flying one of the most complex military activities. A special aspect of this activity is the need to maintain aircraft in a continuous, high state of combat readiness.... This requires the highest degree of organization, discipline, and inner mobilization on the part of all personnel."

The above is from a new, recently-published book by Army General D. T. Yazov, USSR Minister of Defense and candidate member of the CPSU Central Committee Politburo ("Verny Otchizne" [Faithful to the Homeland], Moscow, Voyenizdat, 1988, 352 pages, illustrations, 1 ruble 60 kopecks). Many pages are devoted to Soviet military aviators. The chapter "All-Weather, Missile-Armed" discusses in detail the present state of the Air Forces, the complexity of the flying profession, and those who in the postwar years have earned the homeland's highest honor—the title Hero of the Soviet Union. But this book deals not only with aviation. Our country's heroic past, the history of the selfless struggle for its freedom and independence, and the USSR Armed Forces today comprise its principal content.

The chapter titles suggest to the reader the topics of discussion: "Who Comes to Us With Sword in Hand...."; "On the Field of Kulikovo"; "Home-Guard Militia"; "Under the Banners of Peter the Great"; "Not by Numbers But by Skill"; "It Is Not Without Reason That All Russia Remembers." In the first section the author discusses the need for a solicitous attitude toward history in general and toward military history in particular, and the importance of a responsible, highly objective approach to discussion and interpretation of our homeland's past.

This is important, the author stresses, because "the history of the wars the peoples of our country have been compelled to wage in defense of their homeland is essentially a history of military valor, a history of military fame."

The author notes in particular that the Russian people have been peace-loving from ancient times, seeking to live in friendship with their neighbors, but that they have always had the ability to defend their land and drive back their enemies. The author demonstrates clearly and consistently that on the thin ice of Lake Peipus, on the Kalka River and on the field at Kulikovo, at Poltava, Izmail, and at Borodino, at Kakhovka and Tsaritsyn, on the Perekop Isthmus and at Volochayevka, at Moscow and Stalingrad—in all the many battles and campaigns fought against foreign invaders, our fighting men have invariably displayed staunchness, courage, and military skill superior to that of the enemy. And love for their native land, for the homeland led them into battle and led them to perform heroic exploits.

The author turns to history for good reason. I feel that in this revolutionary period of perestroyka which our Armed Forces are experiencing together with the entire country, this appeal to take a look at our valiant ancestors is timely indeed, this appeal to take inspiration from their courage, their self-sacrifice, their patriotism, in order to work even more enthusiastically on accompilshing the tasks facing our Soviet servicemen—to increase combat readiness, to strengthen discipline, and to overcome the negative phenomena in military service which were engendered by the period of stagnation.

The author discusses in a concise yet comprehensive manner the history of the Russian Army from the moment of its establishment by Peter the Great to the victory of the October Revolution in 1917, establishment in February 1918 of the Red Army, which adopted all the finest traditions of the Russian Army and which became a mighty, unified and invincible force which has been guarding the homeland now for more than 70 years.

One can be proud of the inheritor of the fame of our heroic forefathers. The entire glorious combat history of the Red Army, which proved its invincibility by deeds, excites fervent admiration. These points are discussed in the sections "Given Birth by the October Revolution," "Building and Remaining Alert," "For the Soviet Homeland," and "Fiercely Protecting." The minister of defense reflects on Lenin's profound statement: "No revolution is worth anything unless it is capable of defending itself." Yes, our Great October Socialist Revolution learned to defend itself in the crucible of civil war and the struggle against foreign military intervention. The author shows the immense work by the party to establish and strengthen our army, air force and navy. These efforts were directed first and foremost toward training and indoctrinating military cadres and equipping the Red Army, which in the years immediately preceding the war was transformed into a mighty defensive bulwark of the Soviet Republic. The author also discusses equipping of the Soviet Air Forces with new types of aircraft during this period.

The section "For the Soviet Homeland" is devoted to the years of the Great Patriotic War. A great deal has been written about this tragic event of the modern era, but the author has found the felicitous form of presentation of his material, which offers the reader an interesting account of the courage and staunchness of the Soviet people and its Red Army, of the initial setbacks and subsequent brilliant victories over fascism. Principal attention is focused on laying forth the party's titanic efforts to transform the country into a united military camp and to mobilize all resources to resist the Hitlerite invaders.

The author presents a consistent discussion and analysis of the most important All-Union Communist Party (of Bolsheviks) Central Committee decrees during this period and the principal decisions of Headquarters, Supreme High Command. The readers will find profound reflection over the most significant operations, battles and campaigns of the Great Patrotic War and a convincing demonstration of the superiority of Soviet military art.

In "Word to the Reader" D. T. Yazov quotes lines from "Letters From a Russian Officer" by Fedor Glinka, who wrote on the eve of Napoleon's invasion: "Are we going to be subjugated? No! The Russians will never give up their land! And if we run short of soldiers each of us will guide a plow with one hand and fight for the homeland with the other!"

"These words," the author notes, "express how Russian people felt about defending their homeland in a past era.... They were in consonance with the ardent resolve of the Soviet people and its defenders to hold their native land in another, much later war which had been forced upon them, a Great War and also a Patriotic War against the fascist invaders. And do you think that today's members of the USSR Armed Forces harbor sentiments which are less deep, pure and strong in carrying out their patriotic and internationalist duty?"

In the chapters dealing with the Soviet Armed Forces today, the author has warm words of praise for the considerable indoctrination work being conducted by commanders and political workers, party and Komsomol organizations and for the way Soviet servicemen, together with the entire people, are working on implementation of the program points of the 27th CPSU Congress and subsequent party decisions, and on progress with perestroyka in the army and navy. The defense minister focuses the readers' attention on the missions of the branches of service and combat arms in light of increased demands, and he has high praise for the

courage and valor of the servicemen guarding the homeland. The author places particular emphasis on the importance of military-patriotic indoctrination of civilians.

This book by USSR Minister of Defense Army General D. T. Yazov greatly helps commanders and political workers in their indoctrination work with personnel and in efforts to increase the combat readiness of units and subunits.

Recently-Commissioned Helicopter Pilots Complain of Treatment in Line Unit

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[Article, published under the heading "Problems of Development of Young Officers," by AVIATSIYA I KOSMONAVIKA special correspondent Lt Col V. Larin: "What Is of Concern to Lieutenants?"]

[Text] The helicopter regiment with which officer A. Kovalev serves is one of army aviation's finest. In 1988 this outfit was awarded a Ukrainian SSR Council of Ministers Certificate of Achievement and a Ukrainian Komsomol Central Committee Challenge Red Banner for excellent results in combat and political training and in socialist competition honoring the 19th All-Union Party Conference.

The men of this regiment give a practical demonstration of their combat skills and ability to work. More than 90 percent of aviation personnel have at one time or another experienced the school of courage in the Republic of Afghanistan, carrying out their internationalist duty with honor. Some aircrews, pilots and aircraft maintenance personnel have served two and even three tours of duty in Afghanistan. This unit's helicopter crews were among the first to take part in neutralizing the consequences of the accident at the Chernobyl nuclear power station. Many have been awarded government decorations.

There are plenty of men in this unit from whom the young officers can take an example and from whom they can learn expert flying skills and the skill of organizational and indoctrination work. I should also note that the regiment is stationed in an area with a favorable climate, near a large southern city. In short it offers good conditions for daily living and military service. But this by no means gives reason to assume that there are no problems with the development of the regiment's young aviation personnel.

What is the matter of greatest concern to the lieutenants? "Awareness of the fact that nobody cares about us here," was the almost unanimous reply to my question by the young copilot-navigators, who graduated from service school last year.

I learned that there were several reasons for their far from high spirits. They do little flying, in a sporadic manner. Lt V. Sembay has more or less lucked out. He has a regular crew, led by experienced commander Capt S. Semenov, who is qualified to fly in all weather and is proficient across the full spectrum of combat flying. It is for this reason that Sembay had logged more than 100 hours in the air when I met him. By comparison, Lt B. Skosarev has logged 25 hours, and Lt S. Ovcharenko has logged 40. And they logged most of these hours during a military district active duty training stint hosted by the regiment. There has been no appreciable movement in their flight training before and after this "window."

There is a single reason for this: there is nobody to fly with the young officers. There is a shortage of experienced aircraft commanders and instructors. Some have not yet returned from Afghanistan, while the others are assigned alert duty, including air search and rescue duty, as well as TDY assignments. But seven lieutenants come to the airfield each day with a secret hope: maybe today I'll be able to go up with somebody....

Is there a solution to this situation?

"The regimental and squadron command element promises that as crews return from the Republic of Afghanistan our flight training will return to normal," commented Lt V. Gladun. "We'll have to wait and see."

"Fine, we shall wait until each of us has an aircraft commander and crew, until we earn third class," Lt S. Ovcharenko continued the conversation. "But what then? Occupy the right-hand seat for five years and totally lose our flying skills? Let's face it: right now any cadet in his final year at service school can fly better than us, who have served a year in the line unit. Did we have to study four years for this? No, a more extensive and harder look must be taken at the problems of development of helicopter school graduates."

The reasoning and suggestions of Lieutenant Ovcharenko and his colleagues boil down essentially to the following. Air Forces flight-specialization higher educational institutions train engineer-pilots, essentially rotary-wing aircraft commanders. But line-unit service for the majority of graduates begins as a copilot-navigator. At best they can become an aircraft commander after three or four years. But sometimes circumstances are such that the move from the right-hand to the left-hand seat occupied by the pilot in command drags on and on. Section navigation officer Sr Lt G. Gunko, for example, a 1981 graduate, has been waiting his turn for seven years. One can easily imagine the effect this

waiting has on one's morale, not to mention purely job-related difficulties: after such a long period of time it is no easy matter to restore skill levels in helicopter piloting and combat flying.

The lieutenants questioned whether this was not too costly to the state, to the USSR Ministry of Defense and the Air Forces, investing all that money into training pilots who then begin their line-unit service essentially as navigators.

The young helicopter pilots I interviewed suggest as one possible solution to the problem changing in the table of organization the position of copilot-navigator with the position of "pure" navigator. They are of the opinion that this would enable warrant officers who have completed the navigator training course to fly as navigator. Experience indicates that today many warrant officers, replacing officers, are successfully performing the duties of helicopter flight technician [crew chief]. And there are many warrant officers who want to become a navigator. Thus positions which are "low-prestige" and dead-end slots for officers from the standpoint of career advancement could be made into high-prestige positions for warrant officers.

One could argue with some of the opinions stated by these young officers. We shall start with the comment that one can view somewhat differently the "low-prestige" position of copilot-navigator, as a first step on the road to combat proficiency, a command cadre smithy and reserve. It is for good reason that squadron deputy commander for political affairs Maj Yu. Ryazantsev commented in our conversation on this subject: "He who wants to advance to command and proves his desire with work will attain his goal. And fairly rapidly."

The political worker backed up his statement with the following figures: last year 11 copilot-navigators, 1984 and 1985 graduates, were promoted to helicopter commander. The best officers of the 1986 graduation class were designated candidates for aircraft commander. Therefore the lieutenants' prospects are not really so hopeless. A great deal depends on the officers themselves.

But let us assume that the young officers' suggestions have been adopted and all of them have become aircraft commanders. What do we do with their senior colleagues, veteran pilots who have not reached retirement age? What do we do with those helicopters designed to be flown by a crew which includes a copilot-navigator? In addition, why is the appointment of recent service school graduates to the position of copilot in Long-Range Aviation and Military Transport Aviation considered a normal thing, while in Army Aviation copilot-navigators, who essentially are the same thing—the helicopter commander's assistant—resent their lot?

No, things are not all as simple as it seems to the lieutenants. Their desire to do more flying, to increase their skills, and to rise in position and rank is praiseworthy, but military service cannot be viewed solely from the selfish aspect of what's in it for me. One must also give, working hard and conscientiously. The men in this regiment like their duty station, and naturally there are always plenty of applicants for any vacancies which open up. The lieutenants are well aware of this. Herein lies in large measure their concern over their future.

"Circumstances face us with a choice: either duty station, or career in the positive meaning of the word," Lt B. Skosarev commented in this regard.

While feeling dissatisfaction with the results of their first year of line service and with their flying, nevertheless not one of these lieutenants has as yet expressed the desire to show what he can do, to demonstrate his knowledge and ability in harsher and more severe conditions. Apparently each of them has made his choice nevertheless in favor of duty station and will serve as a copilot-navigator as long as is necessary.

But here is another question: are young copilot-navigators sufficiently prepared in a professional respect in order successfully to perform their aircrew duties? Let us hear the opinion of squadron political worker Military Pilot 1st Class Maj Yu. Ryazantsev: "This does not apply to everybody, but the navigator proficiency of some of the recent service school graduates leaves something to be desired. For this reason the psychologically difficult process of making the transition to the copilot's seat by the newly-arrived service school graduate is frequently aggravated by poor knowledge and especially by poor skills in performance of navigator duties. In addition, many lieutenants have an exaggerated opinion of themselves.

"And yet," the officer went on, "on the Mi-6 and particularly the Mi-8 helicopter the copilot-navigator should be a highly-proficient professional. We have such officers in our regiment and squadron. Young pilots who show their colleagues an example of persistent, purposeful work to improve themselves include Lieutenants Akimov and Khramov. Arrogance, however, and an uncritical attitude toward the attained level of one's job proficiency are poor attributes in the military. Lieutenant Gonchar, for example, at first had a high opinion of himself but inadequate knowledge of navigation. After the third time he got lost during a flight, section commander Captain Kharin issued an ultimatum: either Gonchar would learn to do his job properly, or he would be replaced. The party and Komsomol organizations stepped up indoctrination work with this young officer. Veteran pilots and copilot-navigators have been assisting him in his professional, commander development. This officer is now doing a better job."

And what does Lt V. Sembay, who has logged the most hours, think?

"The amount of knowledge and skills obtained at service school make it possible, in my opinion, with good organization of young officer training in the regiment, to break them in without undue delay. But unquestionably there have been difficulties and apparently there will continue to be. Let me tell you what I myself have encountered...."

What he told me boils down to the following. Flying the same familiar routes in flight training at service school, disinclination on the part of some pilot cadets fully to prepare themselves on their own for flight operations, and borrowing already route-marked charts and navigation calculations from comrades by no means promote the development of independence and acquisition of skills in rapid, accurate calculation of unfamiliar routes. In the line regiment, however, the lieutenants themselves must prepare all navigation documentation for virtually every operational flight. At first this is not easy.

V. Sembay and the other young officers had to start practically from the ground up at mastering procedures of preparing for and executing flights using local air routes (MVL). I should like to take this opportunity to recommend to officials at Air Forces higher educational institutions that they incorporate into the flight and navigation training curriculum familiarization flights on local air routes for helicopter student pilots. It is important that every future copilot-navigator gain a more or less precise picture of the system of handing off control of aircraft by route segments, system boundaries, manner and procedure of using communications equipment and electronic support services facilities, as well as other specific features of such flights. They should be preceded by classes in theory and practical training classes in which the undergraduate pilot trainees can obtain knowledge and learn skills in preparing for activities of this kind, beginning with the basics: what documents a copilot-navigator needs, where they are to be found and obtained in the regiment, at enroute airfields, how to prepare route charts, etc.

There is also need for student pilots to learn the skills of low-level flight operations while still at service school. In short, the greater the degree to which the training process at flight school is organized to conform with line-unit flying, the more rapidly and effectively young officers will accomplish job proficiency in the line regiment.

We should note that many of the items mentioned by the lieutenants have already been incorporated into the new training curriculum for Air Forces flight schools. Therefore let us hope that future graduates will not be forced to learn from the ground up certain flying and navigation skills after being assigned to a line unit.

Naturally difficulties in professional advancement, both objective and subjective, leave an imprint on the attitude of young officers. But not, we believe, to such a degree that they should feel useless and unwanted in their unit.

But certain things are matters of concern. Out of eight last-year flight school graduates, only one has been provided housing, and that one was a special case, due to family circumstances. Three young families and four bachelors are being quartered at private apartments, since the garrison currently lacks dormitory-type officer quarters. There are also certain difficulties with obtaining employment for officers' wives, with kindergarten and nursery school, and with obtaining medical and other services for the members of families officially without permanent residence. I cannot comprehend why this is, but local organizations and establishments, I was told by the young officers, frequently refuse to accept as an official document a military document indicating residence registration to the military post.

Under the circumstances it has been difficult this year for the unit affirmatively to resolve matters pertaining to establishing permanent-assignment aircrews and obtaining housing for the young lieutenants. In my opinion it is for that reason particularly important and necessary to give the copilot-navigators every possible assistance with word and deed, as well as moral support. I would like to see more genuine warmth and comradely solicitude toward the young officers by commanders, political workers, party and Komsomol activists, and by their fellow military personnel, for one's mood and attitude are not improved by receiving the following advice from "well-wishers": "If you don't like it, request a transfer to the Transbaykal."

Unquestionably the difficulties will be surmounted in time. Today's lieutenants will become aircraft commanders, section and squadron commanders. But I feel that it is no less important for them to develop into mature individuals and worthy members of the officer corps. It is important that each of them, putting down "roots" in the regiment and garrison, greet newly-arrived lieutenants not as potential competitors in career promotion, improvement of housing conditions, and obtaining of other material benefits, but rather as friends and comrades in arms. This should be said if only because such an attitude toward newly-graduated officers is still encountered in the line units. And we should not forget about this, especially in training and indoctrination work with young officers, in whom we rightfully place high hopes pertaining to achieving the end goals and tasks of perestroyka in the Air Forces.

Recent Flight School Graduates Master MiG-29 Fulcrum Fighter

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[Article, published under the heading "For a High Degree of Combat Readiness," by Military Pilot 1st Class Gds Lt Col V. Gelmich, squadron commander: "Repaid With Interest"]

[Text] A MiG-29 fighter was on final approach. Regimental deputy commander Gds Lt Col A. Mozgovoy,

who was directing flight operations that day, was closely observing the aircraft as it descended on final, flown by a graduate of the Chernigov Higher Military Aviation School for Pilots, a young pilot who was rapidly building his proficiency. At the moment, however, the aircraft was approaching the runway at an excessively steep glide angle. As was to be expected, the pilot flared high and touched down far beyond the precision touchdown area.

Guards Lieutenant Colonel Mozgovoy was puzzled over why a gross error had been made by a pilot who just a few days before, during a check flight in a combat trainer with one of the squadron's instructors to check out his flying technique, had correctly executed the landing approach. Could the instructor have failed fully to ascertain the pilot's level of proficiency? He decided: "I am going to have to fly dual myself with the guards senior lieutenant. And I'm going to have to check out the instructor as well."

Experience has shown that this was a correct and timely decision on the part of the regimental deputy commander. Mozgovoy was of the opinion that to allow into the air a combat pilot who has not corrected a mistake in flying technique means asking for a mishap-threatening situation. His own efforts enabled the pilot to become clear on proper landing approach procedures and made the instructor improve the quality of his pilot training.

This incident demonstrated once again that one must keep a constant eye on the job being done by the instructors and ensure that their methods skills improve.

In order to know the extent to which an instructor is able promptly to spot, analyze, and prevent mistakes by the pilots with whom he flies check rides and whether he is able correctly to determine the causes of mistakes and to obtain precise flying technique from his pilots, we keep a close eye on quality and effectiveness of dual-instruction flights. Sometimes an instructor pilot does not go beyond demonstrating execution of the maneuvers being taught and fails to verify that the pilot has mastered them. And yet precisely such instructor verification is a main element in determining a pilot's readiness to go up solo.

In our guards fighter regiment considerable attention is devoted to methods training and improvement of the skills of instructors and element leaders. By decision of the commanding officer, his deputies personally verify correction by instructor pilots of errors revealed in the course of flying technique performance evaluation and when flying as instructor or element leader.

At post-flight critique and analysis sessions and during methods classes, analysis of mistakes becomes, figuratively speaking, an object lesson for everybody. The most typical mistakes are considered when checking the preparedness of commanders and element leaders for flight operations on preliminary preparation days. In addition to the maneuver sequence prescribed by the flight assignment, performance evaluation includes flight maneuvers and procedures during the performance of which mistakes were made. In certain cases special flights are scheduled to check instructor skills or performance of an element leader.

Prior to commencement of air-to-air combat training, for example, some commander-instructors and element leaders were tested on instruction methods used in executing vertical maneuver. This enabled the pilots, under the guidance of well-prepared instructors, better to master air combat maneuvers.

In organizing the training and indoctrination process, we adhere firmly to the principle of being instructed by one's immediate superior. Therefore from the day young pilots report for duty with the squadron, each instructor begins a thorough study of the professional, moral-political, combat and psychological qualities of his pilots. And he always bears in mind that as you sow, so shall you reap.

Particular concern is shown for increasing the young pilots' knowledge particularly in the practical operation of a complex modern aircraft. I should state in all fairness that young pilots are well trained and prepared from the standpoint of theory. But many deficiencies are encountered as regards practical aspects.

For example, Gds Lt V. Kovalskiy, recent graduate of the Chernigov Higher Military Aviation School for Pilots, has extensive notes on his aircraft, discussing in detail, for example, the operating principles of his local radio navigation system. But his practical knowledge in this area was weak. This officer was not thoroughly familiar with cockpit equipment procedures during cross-country flight or during the landing approach. It is not surprising that he at first experienced difficulties in operating the local radio navigation system controls. And if one considers that he had to undergo conversion training to the MiG-29, one can understand how much work Guards Lieutenant Kovalskiy's instructor had to do with him.

He taught his charge to calculate a cross-country flight by airspeed and time en route, to compute bearings and course angles, to determine horizontal distance to linear or area reference landmarks, as well as other parameters. To date Kovalskiy has successfully completed combat maneuvering in a flight-size element, flies his MiG-29 at night with sureness and confidence, and has improved to the proficiency level of military pilot 2nd class.

When newly-arrived pilots undergo familiarization procedures in this regiment, paramount attention is devoted to strict observance of methodological sequence. In particular, we adhere to a specific system calculated to bring along each pilot to a proficiency level at which he will be capable of carrying out an assigned mission effectively and with high quality either independently or in a multiple-aircraft element.

Proceeding from the specific features of modern air-to-air combat, we always require that every instructor be thoroughly familiar with the individual qualities of their pilots. Only under these conditions can we achieve successful completion of the training schedule in an orderly manner. The squadron commander and his deputies are able to devote greater attention to training both the novice pilots and their instructors and to devote time to improving training methods.

As we know, not every first-class combat pilot can be a capable instructor pilot. Some pilots do better than others. Why is this? There is no simple answer. One factor is lack of talent for teaching, essential ability, a thoughtful approach to things, and sometimes simply patience. It is of course a good thing if such an officer, overcoming a false sense of embarrassment, tells his commanding officer about this. But if he does not? The training process can suffer. Therefore it seems to me that a commander must take this into consideration.

In our regiment the commander's staff provides certain assistance in this matter. It organizes instructor pilot screening and selection, plans and schedules drill sessions with flight and technical supervisor personnel, conducts training sessions with instructors, scientific-technical and methods conferences, and exchange of know-how. Recently, for example, a training class for instructor pilots on the topic "Method of Conducting Post-Flight Critique and Analysis" was conducted in this regiment, at which the most typical trainee errors were thoroughly examined with the aid of monitoring-recording equipment and recommendations given for correcting these errors. Other training classes were also held, which helped further improve the instructors' methods skills.

In order to prevent possible deviations in the proper methodological sequence of pilot training, staff officers thoroughly study mistakes occurring during the preceding month and determine the degree of readiness of the pilots to perform forthcoming training tasks. They verify the proficiency of instructor pilots and element leaders with particular thoroughness and care. When necessary, they specify measures to correct spotted deficiencies. All comments, refinements and recommendations made by the staff are incorporated into the squadron flight training schedules following detailed discussion at a special conference of unit supervisor personnel. Only after this does the commanding officer approve training schedules. This verification of planning and scheduling eliminates the possibility of assigning the pilots excessively difficult training sorties and ensures the requisite sequence and most efficient training method.

In order to determine a uniform training method in our unit, command personnel flights are scheduled for our young officers just prior to dual-instruction training. Matters pertaining to method of executing specific maneuvers, as well as existing methods formulations are refined in final detail. This is done in order subsequently to conduct training flights in strict conformity with the requirements of documents governing mishap-free flight operations.

We usually schedule flight operations in such a manner that not all young officers fly on the first day. We have adopted a method whereby we observe so-called "phased" breaking-in of young officers. The methods council feels that it is much more beneficial to give a pilot two or three flights a day rather than a single training flight. As a rule a trainee makes a fair number of mistakes on the first flight, fewer on the second, and still fewer on the third. Skills are developed and reinforced more efficiently with this method. At the end of the dual-instruction period some pilots are somewhat further advanced, while others are lagging somewhat behind, but both time and instructor manpower are expended more economically with this approach.

Our instructors are now well aware of which young pilots learn quickly and which ones have difficulty mastering flight maneuver sequences. Nevertheless they do not seek to push the pace of the dual-instruction phase but adhere to sequential advance from the simple to the complex and from the complex to the highly complex. And advanced know-how suggests that during conversion training each pilot must go through a breaking-in process, logging the requisite minimum number of flight hours.

In order to ensure continuous improvement of teaching skills, each week we hold conferences of instructor personnel who teach the young pilots. Reporting what they have accomplished, the instructors characterize each trainee and his performance in the air. Instructors are given a performance evaluation at these conferences. One instructor, for example, was sternly reprimanded for abusive railing at his charges in the air. This has had an effect. No longer does this officer engage in such behavior.

We attach considerable importance to assisting instructors, and particularly flight commanders, in ensuring high quality of pilot ground training, classes on theory and practical class activities, and explanation of the specific features of forthcoming training sorties. We help the young pilots study the appropriate topics pertaining to aerodynamics and flying technique, so that prior to commencement of flight operations the officers have mastered to a level of automatism cockpit equipment manipulation procedures on the simulator. Classroom group instructional activities and brief tactical drills, at which the most highly-proficient instructors frequently function as training activity leaders, help develop combat pilot proficiency.

In organizing assistance to the young pilots in mastering complex techniques of combat-flying the MiG-29 fighter, we endeavor to make fuller use of the experience

and know-how of air-to-air combat experts—high proficiency-rating pilots officers K. Totskiy, V. Kabanov, and others. At the initiative of the party buro, the experience and know-how of leading instructors is synthesized on a regular basis; they lecture the younger pilots. The lieutenants derived considerable benefit, for example, from the presentation of party member Gds Maj A. Chekunov, who discussed the specific features of conducting air-to-air combat in clouds at low level with heavy enemy electronic countermeausres.

The better the organization of individual work with young pilots, the more successful the mastery of complex types of fighter combat flying will be. The regimental command authority and party organization display continuous concern with ensuring that experienced instructor pilots work with them on a regular basis. They also readily share their knowledge, conduct a critique and analysis after each training sortie, analyze tactical innovations, and give competent recommendations. Flight data recorder tapes and other performance monitoring materials are always used in performance critique and analysis. There is frequent analysis of fighter combat operations in local wars, as well as analysis of fighter operations in the Great Patriotic War, of course taking into account qualitative changes in the military.

Party activists also do considerable work with instructor pilots. According to training methods, on a certain training flight it was necessary temporarily to cover over certain performance and navigation instruments when the trainee was flying the fighter under the IFR hood. But the flight commander, who was going along as instructor, failed to do so, endeavoring to make things easier for his charge. It was necessary to have a firm, frank discussion with this instructor after they landed, a discussion which was continued at a meeting of the squadron party buro. The state of affairs in the flight was corrected.

We should like to emphasize that attention toward the instructor pilot is a fundamental element for achieving success in training young pilots. In order for each pilot to be able to prepare his subordinates to fly in a competent manner, he himself should be an expert pilot and possess a strong will, tenacity, and a high degree of methods proficiency. The better the style of our training and indoctrination activities, the effectiveness of which determines not only the development of combat pilots but also their combat readiness and their career progression, the better these qualities will be.

Pilot Physical Training With New PT Manual

91441105f Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 16-17

[Article, published under the heading "Into the Military Airman's Arsenal," by Maj V. Tovt, candidate of pedagogical sciences: "Pilot Physical Training and the New Manual"]

[Text] In the new Manual of Physical Training in the Soviet Army and Navy (NFP-87), physical conditioning of military personnel is viewed as a basic combat training subject. The increased importance of physical fitness is connected with an enhanced role by the human factor in operating complex equipment and weapons, which also applies in full measure to military pilots, the endurance and health of whom determines in large measure success in operation and combat employment of modern fixed-wing and rotary-wing aircraft.

The manual requires that every training class or drill produce maximum effect and maximally promote improvement in the combat skill of flight personnel. But this document contains only general guidelines on physical training of flight personnel in the various air components. In order to meet the requirements of the manual it is essential to have the ability to isolate the main element, correctly to distribute manpower and assets, and to choose an optimal methodology of training exercises taking into account the specific features of organization of aviation personnel combat training. This problem cannot be resolved without precise, correct planning and scheduling.

A flight personnel physical training scheduling algorithm contains the following sequence of performance of principal elements: substantiation of training class tasks in relation to the nature and dynamics of the flight operations workload, choice of means and methods of accomplishing these tasks, and determination of means of verification.

Substantiation of tasks is the most critical stage of planning. It determines the content of pilot physical training. The main difficulty here lies in the fact that accomplishment of the goal involves the ability of command personnel to select from a great many different training topics precisely those which will help achieve successful job-specific fitness, as well as to distribute them along the scheduled timeline and to coordinate them with the flight operations schedule. It is important to ensure that the volume of designated physical training can be accomplished within the allotted time frame. Mistakes here lead to considerably-diminished results.

In order correctly to determine physical training tasks it is necessary to know their classification. They are presented in the manual in two forms: general and job-specific. Of course this does not make it possible fully to take into account the effect of job-related workload on the military aviator. For example, when conversion-training over to a new combat aircraft it is necessary to improve the specialized physical qualities of flight personnel. I am sure that an insufficiently experienced physical training instructor will conduct physical training with a maximum physical workload which, combined with the flight operations workload, may lead to excessively fatiguing personnel. And this without question will have a negative effect on aircraft operation. Apparently at this stage of pilot training it is important not so much to force the pace of improving job-specific physical and psychological qualities as primarily to maintain an optimal level of these qualities.

Pilot Physical Training Tasks and Task Execution Verification Indicators

Current (individual physical training session)	Tasks	General	Verification indicators	Job-specific	Verification indicators
	On the day preceding and just prior to flight operations	Preparation for flight operations (calisthenics)	Subjective physical well-being during flight operations	Moral-psychological preparation	Efficiency of actions during flight
	Between flying days and in the process of standing alert duty, following flight operations	Fatigue prevention	Subjective physical well-being during flight operations	Prevention of nervous and psychological fatigue	Efficiency of actions during flight
	Not conducted during flight operations	Development of general physical qualities	Volume and intensity of physical workload	Development of job-specific physical qualities	Volume of specialized maneuvers and their work loading
Intermediate (at combat training activity stage)	Professional development	Improvement of general physical fitness	Test performance standards	Improvement of job-specific physical fitness	Job-specific performance standards
	Conversion training to new aircraft	Maintaining high level of general physical fitness	Test performance standards	Maintaining a high level of job-specific physical fitness	Job-specific performance standards
	Intensive flight operations	Maintaining high level of general physical fitness	Test performance standards	Maintaining a high level of general physical fitness	Job-specific performance standards
	Daily combat training activities	Improving physical qualities	Test performance standards	Improving job-specific physical qualities	Job-specific performance standards
	Therapeutic rest	Active rest and recreation	Functional condition	Maintaining a high level of general physical fitness	Job-specific performance standards
Long-term (for entire period of combat training activity)		Maintaining a high level of general work fitness and physical conditioning	Functional condition and state of health	Maintaining a high level of general physical fitness and extending length of flying career	Flight activities efficiency indicators

In addition, as experience indicates, in the course of specialized training exercises the instructor frequently ignores general physical training tasks. And yet it has long since been demonstrated that general and job-specific tasks cannot be performed separately. For example, while improving such a quality as capability to withstand G loads on the 360 degree swing, aviation personnel at the same time develop agility. It is therefore more advisable to schedule these two types of task together, regardless of the specific thrust of the training session. If necessary one should devote greater attention to development of general or job-specific qualities.

Thus at the stage of flight personnel conversion-training to a new aircraft, the following tasks must be defined: first, maintaining a high level of general work fitness in the process of conversion training; second, preparation of the system for flight operations and prevention of job-specific fatigue, or development of the necessary qualities in relation to the nature of the flight operations workload.

I believe that the accompanying table can help avoid mistakes in planning and scheduling physical training. The table contains long-term, intermediate, and current groups of physical training tasks. Each includes general and specialized topics. First the long-range topics are specified, followed by intermediate and current.

When planning and scheduling physical training sessions it is essential to take into consideration the flight operations workload and endeavor to ensure that, reinforced by physical training classes, it produces a standard unit of training effect. This will make it possible to accumulate small adaptive changes in the system and to achieve certain changes capable of ensuring a high degree of resistance to the effect of adverse factors of job-related activity.

Accomplishment of each physical training task is achieved with the physical conditioning methods and the list of physical training exercises specified in the manual.

It is also important extensively to utilize the recommendations of specialized textbooks and training manuals.

In spite of the large number of recommendations, physical training drills methods should be selected by a qualified specialist. This is due to the fact that combining different means in the course of a physical training class can sometimes produce a negative result. For example, alternation of running exercises with exercises on the 360 degree swing, if preventive means are not taken, promotes varicose veins in predisposed individuals.

An important advantage of the new manual over previous manuals lies in the fact that conformity between physical training tasks, the means of accomplishing them, and methods of verification is reflected in the new manual.

Verification of accomplishment of tasks is performed with the aid of standard tests and performance standards for the indicators listed in the table. For a fuller and more objective evaluation it is advisable to compare test exercise results with indices of functional tests, psychological and sensorimotor tests. This will make it possible not only to improve reliability of verification but also to determine in flight personnel level of motivation for physical training classes and degree of development of volitional qualities in aviation personnel. We should emphasize that objectivity of evaluation is determined by how closely physical training, medical service, and psychological aptitude screening specialists collaborate with one another.

Practical adoption of the provisions of the new manual in Air Forces units depends to a decisive degree on command personnel. Will physical training—one of the basic combat training subjects—become an effective means of increasing flying skills, extending the flying career of aviation personnel, and improving flight safety? This is determined by their knowledge and ability, sense of responsibility and integrity, activeness and innovativeness.

Fighter Pilot Fails Instrument Check Ride

91441105g Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) p 17

[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Military Pilot 2nd Class Maj B. Kononenko: "Price of Complacency"]

[Text] The flight operations shift began in VFR weather, but soon the weather deteriorated, just as the duty weather forecaster had warned at the briefing. The sky clouded over. Young pilots sr lts S. Kuvikov and Yu. Lavrentyev were to take turns flying a check ride with instructor Lt Col V. Zhivotov into the practice area. How well they did on the check ride would determine whether these pilots would qualify to fly as pilot in command in instrument meteorological conditions.

The fighter flown by Senior Lieutenant Kuvikov entered the practice area precisely on schedule, but slightly off course from the practice area center point. It was impossible to get one's bearings visually, as the dense, white cloud mass surrounding the canopy dropped visibility to zero. The pilot focused his entire attention on his instruments.

The instructor decided to leave Kuvikov entirely on his own and not to interfere, although he was prompted to suggest to the pilot that he move closer to the center of the practice area. The fact is that as the pilot commenced executing the first maneuver it became clear that the aircraft would remain within the boundaries of the practice area.

Kuvikov performed the maneuver sequence, receiving a high mark and approval to fly solo IFR.

Things were different when Senior Lieutenant Lavrentyev went up. Recovery from the second flight maneuver brought the fighter right to the edge of the practice area. Barely had the pilot commenced a horizontal maneuver when the flight operations officer's voice came over the radio: "205, turn to heading... Proceed to center of practice area...."

From this moment Lavrentyev began making one mistake after another: he failed to maintain the prescribed airspeed, altitude, and G load. The entire flight virtually comprised a sequence of one mistake after the other. It is not surprising that the instructor occasionally had to take over the controls.

A legitimate question arises: why is it that two pilots with approximately the same level of training and preparation produced such a differing flight performance when flying the same maneuvers under identical weather conditions? It was ascertained during the post-flight critique and analysis session that Sr Lt Yu. Lavrentyev, to put it bluntly, had not bothered to prepare thoroughly for such an important training flight. He had not done a ground simulator session, although this was prescribed, and he had failed to refine his execution of aerobatic maneuvers without reference to the ground. This officer had been hoping that he would be able to gain his bearings from ground reference points. But weather conditions changed. In the resulting circumstances this pilot failed properly to perform the scheduled training flight sequence.

This reconfirms the axiom that there are no simple, easy flights. One should prepare for every flight as for a serious test of job proficiency. A great deal is said about this, but unfortunately words are sometimes not followed by concrete actions.

One might ask where the flight commander had been, for he is the primary person responsible for his men's preparation for flight operations. Why is it that he did not promptly note Senior Lieutenant Lavrentyev's tendency toward complacency and irresponsibility?

Experience convinces us that a practice session on a flight simulator is beneficial only if it is properly organized and well executed. Unrealistic simulation and excessive situation simplification must not be allowed, since they negate the very substance of the training session and make it a waste of time.

Incidentally, Sr Lt S. Kuvikov has thoroughly mastered this truth. During a simulator session he thoroughly rehearsed the initial phase of the training flight in case of deviation from the center of the practice area, and he took other situation possibilities into account as well. He followed the correct procedure of assuming that the flight would take place in instrument meteorological conditions. Therefore when he was rehearsing on the simulator, he checked his position in the practice area only by reference to the instruments.

Thus the method applied in preparing for a training sortie eliminates mistakes in the air and helps improve flying skill and flight safety.

Economic Accountability and AF Research Establishments

91441105h Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) p 18

[Article, published under the heading "Economic Reform in Action," by Col N. Karasev, doctor of economic sciences: "Science Operating Under Economic Accountability"]

[Text] Science, just as other aspects of our lives, has become involved with perestroyka. It was noted at the 19th All-Union CPSU Conference that a great deal is changing in science. Indeed, one can only welcome the introduction of a new wage system. Many institutes have been incorporated into associations, and new organizational forms are appearing, such as interbranch scientific-technical complexes. An edict has been issued calling for scientific organizations to convert over to full economic accountability and self-financing. This decision applies in full measure to scientific research establishments of the Ministry of Defense, including the Air Forces.

What is the practical significance of changing scientific organizations over to full economic accountability?

First of all, scientific organizations become socialist goods producers, and scientific-technical product becomes a commodity, that is, it is sold and purchased on the basis of unity of cost and use value. Scientific-technical product as a commodity includes completed scientific research, design, and engineering projects and services, manufactured experimental models or batches of goods (product), carried out in conformity with the requirements specified in a contractual agreement and accepted by the client organization.

Thus economic accountability of science requires that the goods, that is, the result, be paid for. But a question immediately arises: when, at what stage? Will this be the direct product of the developer's labor (report, set of drawings), a working prototype model, actual adoption and attendant effect, or, finally, the end result—a new technological and economic level of production achieved as a result of adoption? As a rule the actual value of scientific-technological product is not apparent at the moment of completion of development. So many thousands of reports, ending not only with most promising conclusions but also with calculations of anticipated effect, have proved useless and ended up gathering dust on shelves!

As we know, in order for a product of labor to be transformed into a commodity, it must not only be manufactured for sale but must also possess use value, or utility. A product's utility is revealed as it moves along the chain of consumption. In other words one can state with assurance that a scientific project is indeed effective and merits payment at the moment of practical embodiment or at least practical demonstration. Preceding payments, if such have been made, should be in the nature of an advance.

Consequently a procedure which prescribes demonstration of genuine effect and which specifies commencement of payment of contracted amounts should be formally adopted.

Secondly, the contract is the principal document which governs relations between a scientific organization and a scientific-technical product client organization, including ministries and government agencies. Contracts are drawn up for scientific research, design, and engineering projects to develop new equipment, industrial processes, and materials, for the manufacture, testing and delivery of prototype models or consignments of goods (product), for bringing them into production, for performance of scientific and technical services, and for performance of other services in conformity with a scientific organization's area of specialization.

Upon nonfulfillment of contractual obligations the project-executing scientific organization bears financial liability: to return received funds to the client organization and to pay penalties in conformity with the terms of the contract and current laws.

Third, this means specific financing of specific scientific research and design projects on the basis of contractual agreements with the interested client organizations in

place of financing the existence and operation of an organization. Funds received from client organizations, centralized funds and reserves of ministries and agencies, bank credit and, when necessary, budget allocations will become the primary sources of financing such projects.

A problem arises: will a scientific research establishment's desire to earn money not lead immediately to a major cutback in theoretical and basic research, that is, that research which is transformed into a "scientific commodity" only after a certain period of time?

Under present conditions research which will yield return after several years can be paid for only on the basis of government procurement orders—from the state budget and from the funds of the higher agency. But what percentage government procurement orders can be considered optimal in the operations plans of a given institute? Experience indicates that a certain proportion between government procurement orders (67 percent of the institute's budget) and direct contracts with client organizations (33 percent) can be acceptable. In such a case it will not be necessary to curtail basic research or to "eat away" scientific potential, although it is by no means a simple matter to acquire 33 percent commercial-contract projects. Nor should one disdain to go after so-called minor earnings, such as scientific services, etc.

Guarantees of a scientific research establishment's ability to pay in the form of government procurement contracts and commercial contracts are the basis used by financial institutions for disbursing scientific personnel salaries.

Fourth, scientific and technical product should be paid for at contractually-agreed prices. A scientific organization reaches an agreement with a client organization on prices for scientific research, design and engineering services, experimental product, scientific and technical services, and other kinds of goods and services prior to commencement of work, on the basis of required effectiveness, quality, and work performance timetable. A cost overrun by the executing organization beyond the contractually-agreed price shall be at the expense of the executing organization unless agreed to by the client organization.

If a project is terminated through the fault of the client organization, payment shall be made according to actual expenditures plus a profit margin specified in the price for the contracted work.

Fifth, a scientific organization's profit (income) becomes the principal source of scientific-technical and social development and material incentive (payment of wages and salaries).

A scientific organization shall cease to exist with an absence of research and development client organizations, if a scientific organization operates for an extended period of time without producing results, or if measures taken by this organization and higher agencies to ensure efficient operations have failed to produce positive results.

As can be seen in the appropriate recommendations of the 19th All-Union CPSU Conference on restructuring our country's economy, the point of juncture between science and practical military activities constitutes the principal field of application of economic methods in the activities of Air Forces scientific establishments. The principal danger here is the mechanical transfer to this area of the principles and approaches characteristic of economic accountability in the material domain, such as in the activities of aircraft maintenance depots. Hence the task of constructing the economic-accountability mechanism in such a manner that it considers to the fullest degree those features inherent in military, including aviation, scientific research establishments.

Air Forces scientific research establishments are actively engaged in devising specific methods of implementing the aforementioned principles of economic accountability. A great deal has been accomplished in this respect by the organization headed by Maj Gen Avn A. Batalov. Here a team of economists under the direction of Lt Col B. Sharafutdinov has drawn up a number of methods documents which specify the manner and procedure of planning and organizing the establishment's economic-accountability activities. Other Air Forces units and establishments are using these documents.

At the same time practical experience confirms the correctness of the appraisal made at the 19th All-Union Party Conference to the effect that the radical economic reform has advanced much further at the level of enterprises and scientific research establishments than at the level of central government agencies. As a result many Air Forces organizations, in the course of drawing up methods to follow in economic-accountability activities, encounter problems which they themselves are unable to solve at the present time by the resolution of which determines in large measure their entire future economic management in conditions of self-financing. As of the time when this article was being readied for publication there was lacking the needed clarity in such fundamental matters as: specifically who should become the prime client organization of an Air Forces scientific research establishment, what should be the manner and procedure of drawing up contractual agreements on government procurement orders, how will officer personnel pay be financed at economic-accountability scientific research establishments, and how can one avoid expenditure-based methods of pricing the goods produced by scientific establishments? These and other such matters require resolution.

Medical Aspects of In-Flight Emergencies
91441105i Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 22-23

[Article, published under the heading "Flying and Psychology," by Maj Gen Med Serv S. Bugrov, Honored Physician RSFSR, candidate of medical sciences, chief, Air Forces Aerospace Medical Service: "If the Situation Has Changed"]

[Text] Analysis of mistakes by aircrew members in the air confirms that many involve inadequate psychophysiological preparation by the personnel involved. The fact is that organizers of combat training do not always attach adequate importance to it. And yet commanders, staff officers, flight surgeons and other specialist personnel directly involved in flight operations should focus attention on this problem.

Some officials assess in an excessively superficial manner the psychophysiological behavior of the pilot (aircrew) in an emergency situation. And yet many acute problems frequently are manifested in concentrated form in such a situation.

A veteran fighter pilot, following an extended period away from flying, departed for the practice area. The weather was sunny and clear. It would seem that there was no indication of an impending problem. If a pilot observes the procedures of the specified flight operations schedule, success is assured. Unfortunately this officer, counting on his own experience and know-how, ignored flight rules and procedures.

How did the violation commence? When he was in the practice area, this pilot attempted to execute several rolls, although such maneuvers were not prescribed for this training sortie. Quite frankly, in committing a gross violation of flight discipline he failed to take into account his own capabilities. His extended period without flying had an effect on his psychophysiological preparation. And the appropriate superiors failed to check this officer's readiness to perform the scheduled sequence of maneuvers.

Here is what happened. In the second part of his roll, at a wing angle of 70 degrees, the aircraft suddenly and abruptly dropped its nose and ended up in a configuration similar to a poluperevorot [between a quarter and half roll followed by a split S]. The pilot was not prepared for such a turn of events. And the critical situation was getting worse. The aircraft was rapidly building up airspeed. The ground was getting closer and closer. Instrument needles were spinning chaotically. High G forces developed, and they were swinging back and forth between positive and negative.

The pilot experienced a number of very unpleasant sensations. He realized the danger of the situation, and he took vigorous steps to correct things. But in vain.... The required forces had increased considerably, while the pilot's operational and functional capabilities were diminishing with each passing second.

Unable to assess the situation quickly and accurately, he performed several banking maneuver elements and then pulled vigorously back on the control stick, but without success. He was unable to bring his wings level. The situation had gotten worse....

Nevertheless, with vigorous intervention by the ATC team, the incident ended without tragedy.

Obviously this incident required a thorough job aptitude profile and methodological analysis. This should also have been done first and foremost as regards that officer who had readied the pilot for flight operations and had approved the flight maneuvers. But for incomprehensible reasons the unit's actions were limited to making out a report to the higher echelon. Apparently the thinking in the unit had been that since the incident had ended without serious consequences, there was no need to analyze the incident in detail.

But the most unforeseen circumstances are encountered during flight operations. The main thing is, in the interests of prevention, precisely to determine the cause of an incident, to determine the specific culpable individual, and to draw up effective measures to prevent the reoccurrence of such an incident in the future.

For example, it is very important to differentiate loss of consciousness from other diversified physiological forms of impairment of conscious activity, when a person incorrectly assesses the situation around him. Thoughts hold to a single event and, although gaze and hands move among monitoring and control objects, he is unable to picture the entire situation. Professionally-trained specialists should also be able to analyze the causes of such a thing.

Let us examine another example. A young pilot was flying solo. The weather began to deteriorate. At the end of a 360 degree banked turn at a bank angle of 60 degrees, instead of bringing his wings level the lieutenant added an additional 60 degrees of bank. This is a very common situation. In the literature it is characterized as illusion of level flight. As a rule the illusion arises due to weakening of the pilot's sensory perception following an extended turn maneuver when the aircraft is vigorously banked, as well as when attention is diverted from the instruments. Its occurrence is also fostered by a certain configuration of external references: clouds, terrain, etc.

Of course an aircraft enters a fairly difficult situation with a 120 degree bank which is not countered with the correct coordinated movements. It rapidly loses altitude and builds up airspeed. An inexperienced pilot involuntarily attempts to reduce throttle. But such action without corresponding dive recovery is little effective, for by the moment when he pulls back on the stick, the aircraft

has already exceeded airspeed limits. In these conditions the effect of control surfaces changes considerably. A slight aftward deflection of the control stick causes the aircraft to pitch up abruptly, and the pilot is again compelled to move the control stick forward. The aircraft pitches down even more abruptly....

It is not surprising that the lieutenant became confused upon getting into a difficult situation.

We could cite more such examples. They confirm once again that the approach to assessing the health of aviation personnel is frequently oversimplified. And this can be a factor in development of an air mishap-threatening situation or can constitute the main factor in such an incident. Let us return to the fighter pilot who was executing rolls. There was maxillary sinusitis in his medical history. Following treatment, this ailment presented no danger when flying under normal conditions. But with unexpected aircraft entry into an aerobatic maneuver, the adverse consequences of this ailment unquestionably came into play.

The flight surgeon should be the first to give skilled assistnace to aviation regiment or squadron supervisory personnel and other pilot training methods specialists in determining adverse factors in the physical well-being of their men. It has been established, for example, that when a pilot gradually develops oxygen starvation there always occurs sequential development of abnormal phenomena, which inhibits speed of reaction and diminishes the ability correctly to assess a situation which has developed during flight, to conduct radio communication with precision and assurance, and successfully to accomplish other tasks. If certain functions have diminished in a pilot, a flight surgeon can determine hypoxia with a high degree of certainty.

We shall now proceed to analyze the most typical causes of occurrence of complex, rapidly-developing dangerous situations in the air connected with the state of health of aviation personnel. They are diversified: from the possibility of worsening of an individual's subjective physical well-being to decrease in or loss of work efficiency due to the fact that a medical condition was not detected and identified in a prompt and timely manner.

While comparing dangerous in-flight incidents, a doctor once noted something common in the actions of military aviators. The pilots were of different age and different level of proficiency. Encountering a difficult situation, however, they acted in a similar manner. Endeavoring to correct the situation, they adjusted certain parameters and switched on backup systems. Their actions failed to achieve the desired objective, however, and primarily because they were only partial remedies and were performed in an insufficiently precise and coordinated manner. What was evident was an insufficient preparedness to act in emergency situations.

This phenomenon has been investigated by aviation psychologists. It consists essentially in the following. For a routine flight it is sufficient for a crew to possess good motor skills honed to a degree of automatism. The greater one's experience, the better these skills become. Special intellectual qualities are required, however, in a hazardous, unexpected situation. These qualities help one recognize and identify the situation, predict situation development, and arrive at a solution. If intellectual qualities of mental transformation of indefinite into definite information are inadequately developed, typical "trial and error" behavior begins to be manifested, accompanied by negative emotioanl reaction.

As practical experience indicates, the professional preparedness of a given pilot to evaluate the onset of an emergency situation is subsequently made more difficult by the rapid development of additional, drastic or violent factors. The most dangerous of these factors is a decrease in emotional stability as a natural reaction by the system to the complexity and unexpectedness of an arisen critical element in flight. Practical combat training experience indicates the need for substantial activation of all types of aircrew specialized preparation for flight operations, including moral-psychological conditioning.

Solving of current problems should be both of a comprehensive and phase-by-phase nature. The following cautions to the pilot are encountered in materials on flight safety published in recent years in journals in many countries: "Never entertain the notion that only the other guy may encounter a critical situation"; "Do not accept the notion that practicing responses to an emergency situation is a meaningless formality," etc. In other words every pilot (crew) should assume the possibility of encountering a critical in-flight situation and should thoroughly take this into account in the process of preparing for flight operations.

Preparedness to respond with sure, precise actions in emergency conditions is a separate area in the training of flight personnel. A large number of total flying hours logged or a great many years of flying cannot substitute for this specific training. This is demonstrated by the experience of the crews of military transport aircraft and major national and international air carriers, the flight crews of which have 10-12 thousand hours or more under their belts. In the absence of adequate attention to specialized training, when experienced pilots encounter difficult situations they frequently respond like poorly-trained novices. At the same time the experience of lightplane aviation indicates an inverse relationship: pilots who have not logged many hours but who constantly practice in extreme flight configurations under difficult conditions soon acquire the requisite skills and do a good job of flying in a difficult situation.

One must bear in mind in this connection that an oversimplified analysis of causes of aircrew mistakes and bias in their determination frequently lead to distortion

of the entire system of preventing violations of flight rules and procedures and diminished ability of training flight personnel to respond correctly in a difficult air situation. But reduction in the course of investigating the causes of air mishaps to a voluntaristic interpretation of the role of various medical conditions as sources of air mishaps not only signifies rejection of violation prevention efforts but also leads to departure from many established and proven forms of medical support of flight operations. Such departures will invariably lead to an increase in the number of grounded pilots and unwarranted harshness of the entire medical examination system, which in this country, to put it bluntly, is already one of the strictest in the world. This will also have a serious effect on the moral-ethical foundations of the flying profession and will affect relations between flight surgeon and flight personnel.

The flight surgeon is also faced with many other problems. These include first and foremost poor diagnosis of the functional state and essential reserves in the pilot's system which ensure a long flying career. Aviation medicine also faces formidable tasks in connection with protecting personnel against the effects of new environmental factors and formulation of improved medical fitness standards based on the concept of job-suited health. Incomplete solution of crucial problems negatively affects the level of reliability of aviation personnel. This does not give the right, however, to treat medical matters in a one-sided and superficial manner in resolving, for example, strictly job-related problems in the area of ensuring flight safety. Such an approach is by no means justified even from the standpoint of long-term methodology.

A comprehensive job aptitude profile and psychophysiological analysis of the behavior of aircrews in difficult, emergency situations offers us extensive possibilities in the search for positive solutions. One can note, for example, if we examine from this point of view the examples with which we began the discussion, that the pilots failed to respond correctly not because of any one reason but due to an aggregate of factors. These include failure to utilize the possibility of reducing throttle when airspeed was building up and altitude loss was occurring, disregarding an attempt at dive recovery without bringing wings level, failure to note that limits had been exceeded, plus others. A comprehensive assessment of both incidents attests to the appearance of a relatively new and separate category of hazardous phenomena which lead to partial loss of spatial orientation even in daylight VFR conditions.

Such phenomena are connected first and foremost with certain aviation development trends: the increasing complexity of modern aircraft; an increase in the number of instrument flights; the specific features of airspace scan as well as the weather conditions in which a flight is being made. This attests once again to the fact that an oversimplified approach to the human factor and a one-sided analysis of this factor cannot be tolerated. It is very important from the standpoint of ensuring flight safety and ensuring that flight personnel continuously maintain a high level of work fitness and maximum length of flying career that mental and emotional stress during flight be fully in conformity with the complexity of the mission and the capabilities of the aircrew.

Aircraft Midair Collision Avoidance

91441105j Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 24-25

[Annotated diagram: "Warning: Collision-Threatening Encounter"]

[Text]

CAUSES OF COLLISION THREATENING ENCOUNTERS AND NEAR MISSES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 1988 pp 24-25

General:

- superificial knowledge of the air situation in the flight operations area;
- lack of continuous analysis and projection of the air situation;
- violation of the rules and procedures of aircraft separation by air traffic control agencies;
- failure to maintain prescribed flight parameters by aircraft crews aloft;
- delayed aircrew reports on forced change in flight parameters;
- incorrect procedure of the conduct of all types of external visual observation when aloft;
- failure promptly to detect aircraft equipment malfunctions leading to unnoticed failure to maintain prescribed flight parameters;
- lack of discipline on the part of aircrews and air traffic control personnel;
- lack of moral-psychological preparedness by flight personnel and air traffic control agencies to act in emergency conditions (confusion, indecisiveness, irresponsibility);
- violation of proper procedures of handing off aircraft from one air traffic control agency to another

When flying a multi-aircraft sortie:

- weak rehearsal of tactical coordination and a faulty mutual airspace scan arrangement;
- poor flight personnel proficiency in predicting the mutual spatial displacment of aircraft;
- errors in maintaining prescribed movement parameters in multiple aircraft operations;
- delayed report on the loss of an aircraft or the lack of visual (innstrument) contact at a specified location and at the prescibed moment in time;
- independent attempt to reestablish contact with the other aircraft in one's element without warning of the loss of continuous coordination;
- poor training and rehearsal of air mission dynamics by diversified methods, including the method of "walking it through"

TIME REQUIRED FOR AN AIRCRAFT TO CLOSE TO A DISTANCE OF 1 KM

Дкм / Фград	10	5	2
0	18	8	2
30	22,5	10	2,5
45	27	12	3
60	36	16	4

Фвиз' град — angle of relative bearing

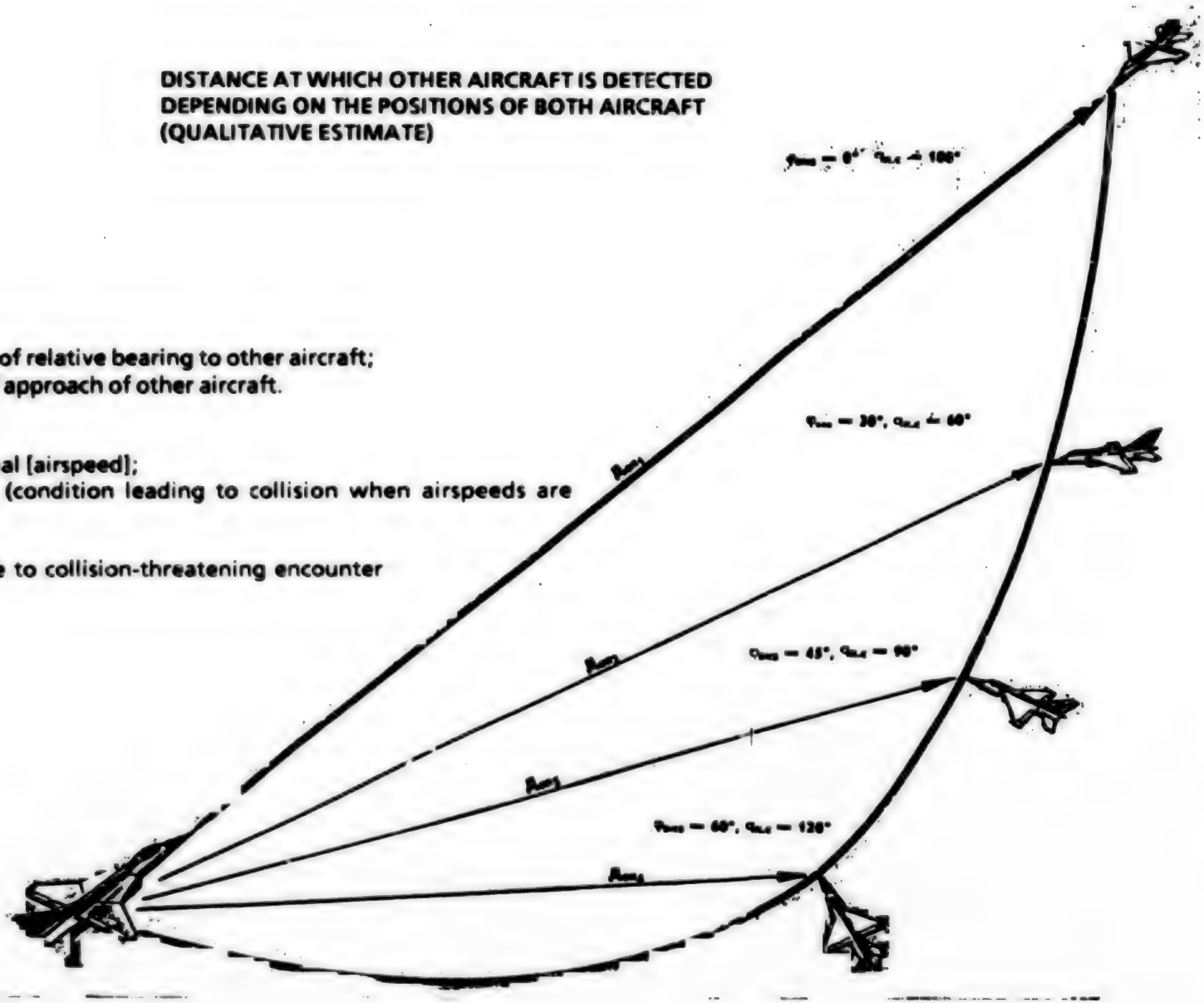
Добн' Км — Distance in kilometers at which other aircraft is detected

DISTANCE AT WHICH OTHER AIRCRAFT IS DETECTED DEPENDING ON THE POSITIONS OF BOTH AIRCRAFT (QUALITATIVE ESTIMATE)

Symbols:
$\Phi_{виз}$ — Angle of relative bearing to other aircraft;
$q_{п.с}$ — angle of approach of other aircraft.

Conditions:
V aircraft —equal [airspeed];
$q_{п.с} = 2\Phi_{виз}$ (condition leading to collision when airspeeds are equal)

$Доп_2$ - Distance to collision-threatening encounter



ACTIONS UPON SPOTTING A POTENTIAL COLLISION SITUATION

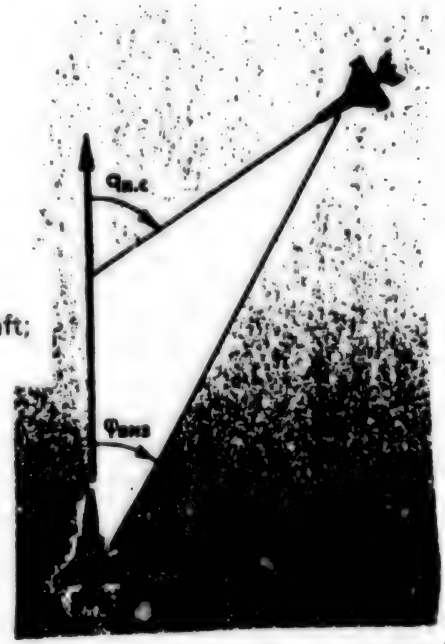
By Air traffic Controllers:

- Immediately give instructions to the pilots of the aircraft in question which will ensure adequate mutual separation tro avoid collision-course passage;
- if the pilots fail to respond to these instructions, use all communications channels (including other aircraft to relay the message) to communicate instructions to the aircraft in jeopardy;
- warn all aircraft in the area of the potential collision situation and instruct all aircrews to intensify airspace scan;
- after the aircraft have been safely separated, verify observance of flight parameters by all aircraft under the control of a given air traffic control agency;
- if a potential collision-threatening situation is spotted by an air traffic controller who is not directly involved in controlling the aircraft in question, said controller must radio a warning of the potential collision situation and instruct all aircrews to intensify their airspace scan to spot traffic.

By the Collision-threatened aircrews:

- immediately maneuver to ensure adequate mutual separation, taking into account mutual aircraft displacement asnd capability to observe tha actions of the approaching aircraft;
- simultaneous with maneuver execution, radio information on the collision-threatening situation and the actions being taken by the pilot;
- if collision is imminent, fully utilize the aircraft's performance capabilities to avoid collision, including flight configurations close to critical;
- after the collision danger has passed, immediately return the aircraft to an attitude and parameters ensuring flight safety;
- verify subsequent flight parameters with the air traffic controller and reestablish them;
- verify that all aircraft systems are in proper working order and reestablish precise coordination between aircrew members.

Symbols:
$\Phi_{ВИЗ}$ — Angle of relative bearing to other aircraft;
$q_{п.с}$ — angle of approach of other aircraft.



Military Transport Pilots Learn Ground-Fire Evasion Departure, Approach Procedures

91441105k Moscow AVIATSIYA I KOSMONAVTIKA ir Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 28-29

[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Military Pilot 1st Class Maj Gen Avn Yu. Lepuntsov and Col Med Serv I. Alpatov, doctor of medical sciences: "Scenario Instruction Over the Airfield (Military Transport Aircraft Shortened-Configuration Takeoff and Landing)"]

[Text] The heavy military transport aircraft under the command of Military Pilot 1st Class Maj Yu. Gapiyenkov was returning to its home field. Ground radioed that the area along the final approach descent was under "hostile" fire. This was not your ordinary tactical problem scenario instruction, but it presented no problem to the aircraft. They immediately took the necessary measures.

They commenced their approach descent in the immediate vicinity of the zone around the airfield defended by security troops, following ground-fire evasion landing approach procedures. The crew intensified external scan. Each crew member closely scrutinized the ground situation in his sector. The tail gunner was assigned an important role in this process. Just as the aircraft maneuvered into alignment with the runway extended, the tail gunner reported over the intercom: "Skipper, missile launched!" The warning was in time. The pilot increased his bank angle and adjusted the throttles. At the same time heat flares were released.... The missile streaked by, leaving a smoky trail behind.There will be many such situations in actual combat. And it is very important that aircrews work persistently and conscientiously preparing for such situations. In short, they were working hard on learning that which will be needed in war.

What was it that enabled Maj Yu. Gapiyenkov's crew to handle the unexpected scenario change? First of all it was of course the aircrew's professional skill, their psychological preparedness to operate in difficult situations, a precise sequence of actions, and solid skills acquired in the process of cockpit drills. The aircrew skillfully employed a tactic which guarantees avoiding taking a hit. In what does this tactic essentially consist?

Shortened-configuration departure and approach.... This technique is introducing something new into military transport aircraft crew procedures which is substantially altering customary operating conditions in the air. In order to master this technique it is necessary to revise certain training methods and to give up certain existing notions. This is dictated by intensification of the basic gradients of the departure and landing approach maneuvers.

Departure angle of climb and rate of climb are increased approximately to double the normal figures, the angle of bank on departure turnout [or initiation of departure spiraling climbout] is increased by a factor of 2 to 3, and turnout is initiated much sooner. The turn to final heading inbound is made 5, 10, and 20 times closer (in relation to standard) to the runway threshold than under normal conditions. The angle of descent on landing approach is increased by a factor of 3-4. Rate of descent increases by a factor of 3-5, and angle of bank [on spiraling approach descent] increases by a factor of 2-3.

Another characteristic feature is that a number of sequential turns are executed as one continuous turn [or spiraling turn], and in certain instances the bank angle required for the maneuver is maintained right up until the aircraft approaches the runway threshold. In these conditions the pace of all procedures is sharply accelerated, flying technique changes, as does the sequence of procedures with engines and cockpit equipment, and the operating envelope narrows. At the same time signs of diminished aircraft controllability appear, and many important reference points are lost from view. In particular, the customary view of the ground from the cockpit changes appreciably, the horizon is lost more rapidly, and the rate of increase in linear dimensions of approaching objects increases.

A high rate of descent leads to diminished positive G force, which frequently creates the illusion of weightlessness, which is also a highly-unusual sensation for the pilot of a military transport aircraft and can have an adverse effect on reliability of his performance, especially if the pilot is not properly strapped in.

On departure, with a high angle of climb and steep bank angle, if the pilot fixes his gaze on ground reference points around which a spiraling climbout is being made, the fact of a high angle of climb with a relatively low airspeed can cause the illusion of loss of airspeed or even that the aircraft is "settling" on its tail. This is a rather unpleasant sensation. In order to overcome it the pilot should periodically shift his gaze to his instruments.

Both departure and landing approach in the shortened configuration are characterized by an aggregate of factors possessing psychological and emotional effect. They include high bank angles during turns and exceeding of normal limits in a large number of parameters, which lead to constant triggering and operation of all kinds of cockpit warning lights and horns. In these conditions there is also a greater danger of faulty actions, and there is greater tension in interactions between crew members. At the same time there continues to be a threat that the aircraft will take a hit by hostile ground weapons and the related need for prompt employment of protective devices.

In view of their complexity, procedures in response to the instructions "Execute shortened-configuration departure and approach" require special training of

aircrews, a high degree of functional response mobilization, and the existence of reserve psychophysiological capabilities.

Obviously efforts aimed at ensuring the safety of departures and landings executed with violent maneuvering should commence immediately after receiving orders calling for operating out of airfields located in areas where there is a danger of an aircraft being "hit" by "hostile" ground fire. In the first phase flight personnel are selected who have fully mastered the combat training course, who as a rule have logged more than 1,000 hours on the aircraft in question, and who have achieved stability in flying technique. Aircrews study basic theory of violent maneuvering of transport aircraft. The physical significance of aircraft maneuvers under these conditions should be explained to flight personnel, and pilots should develop the ability to predict aircraft behavior in configurations close to critical. Training films acquainting flight crews with the forthcoming flight conditions can be highly beneficial at this phase of training.

After completing the theory training phase, aircrews proceed with practical flight procedures under the guidance of experienced instructors. Training continues until pilots have fully mastered violent evasive maneuvers. Aircrews develop emotional stability in the face of unaccustomed and difficult conditions and acquire the ability to evaluate their performance in a more critical manner. They gain closer knowledge of the limits of their own psychophysiological capabilities. Smooth coordination among aircrew members is achieved in this phase, as well as an understanding of the tasks and forms of interaction of crew members at the various phases of such a flight.

Mastery of shortened-configuration departure and landing approach procedures also serves as a highly effective means of increasing flying skills and aircrew emotional stability. In addition, the capabilities of the aircraft and ergonomic deficiencies of the flight deck (layout arrangement of gauges and displays, warning lights, easy visibility of exterior references, etc) can be fully revealed in the process of working on these elements. And this can contribute strongly toward subsequent efforts to improve flight deck configuration and layout.

Nor should one forget how important a role can be played in preventive efforts by flight data recorders. Analysis should be made both of the overall timeline structure of parameter changes and individual parameter deviations which threaten flight safety. One typical error made when flying a landing approach with this configuration has already been discovered—excessive vertical load factor at the moment when the aircraft first touches the runway surface. This can have adverse consequences.

Execution of under-fire approach and departure procedures only following analysis of the flight data recorder tapes from the preceding sortie—this rule should always be followed by air commanders and flight crews.

Training aviation personnel to fly missions involving under-fire approach and departure procedures requires carrying out an extensive aggregate of flying-methods, organizational, medical-biological, and other measures to prevent violations of flying rules and regulations.

The approach and departure tactics discussed above, when thoroughly learned and mastered, will make it possible in actual combat conditions substantially to increase the effectiveness of flight operations and to prevent combat losses in military transport aviation. This problem is of significance both from a scientific and practical standpoint. Full resolution will broaden our knowledge of the psychophysiological capabilities of pilots when executing complex, high-intensity maneuvers and will make it possible to validate new recommendations on maintaining pilots at a high level of job fitness.

Soviets Savage U.S. Military Doctrine

91441105l Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 30-31

[Article, published under the heading "Today's World and the New Thinking," by Military Pilot 1st Class Col S. Zenin, candidate of historical sciences: "Two Policies—Two Doctrines"]

[Text] **"...Our defense organizational development... should guarantee the reliable security of the Soviet State and its allies and should be carried out in strict conformity with our defensive doctrine."**

From the proceedings of the 19th All-Union CPSU Conference

* * *

Questions of war and peace remain paramount in the present complex and conflictive international situation. They occupy the center of attention of governments, parties, and the general public in the countries of all continents. It is therefore entirely understandable why universal interest is focused on the developing dialogue between the USSR and the United States. Significant progress has been made. At the same time there remain many problems which hinder improved mutual understanding and confidence building between our countries for the purpose of ensuring world security. One of the most important problems is the political thrust of the military doctrines of the Soviet Union and the United States.

Following the visit to the USSR by U.S. Defense Secretary Frank Carlucci, voices began to be heard in the Western press in support of his opinion that allegedly there have occurred no substantial changes in Soviet military doctrine and in the directions of organizational

development of the USSR Armed Forces, that the Soviet Union and the Warsaw Pact countries allegedly possess significant superiority in conventional arms, and that the Soviet side is allegedly dragging its feet in the strategic offensive arms talks. But how do things stand in actuality?

It was stressed at the 19th All-Union Party Conference that Soviet international policy is grounded on new political thinking, which is based on the conviction that war must be prevented. This has exerted considerable influence on the forming and shaping of our military doctrine. In the past it was considered as a system of views on preparation for and conduct of a possible future war, while today such an interpretation and conception no longer is in conformity with present realities. War has ceased to be a means of achieving political aims. At the same time the fact that many conflicts between states of different social systems, possessing powerful military forces, have not been resolved, and the fact that there have been periodic relapses to attempts at applying the pressure of force in resolving international problems, as well as the fact that the international arms race has not yet been halted dictate the necessity of concern for security.

Soviet military doctrine, emphasizes USSR Minister of Defense Army Gen D. T. Yazov, candidate member of the CPSU Central Committee Politburo, fully takes into account the factors of the contemporary era. The fundamental content of this doctrine is defined by our priority foreign policy aim—to secure for our people the possibility to live and work in conditions of firm peace and freedom. It is directed not toward preparations for war but toward preventing war, toward strengthening international security. The most important feature of this doctrine is its defensive character. It is manifested first and foremost in the defensive nature of the military-political tasks which the Soviet State sets for itself and in all our practical affairs—domestic and external political, in the nature and content of military planning and military organizational development, and in the demands placed on development of military art.

Wars of conquest have been alien to the Soviet Union throughout its entire history. It has never made preparations for and has never waged war for the purpose of establishing world political domination, has not made and does not make territorial claims on any other state, has no need to extend its borders, does not view any country as an enemy, and is ready and willing to construct relations with all countries on the basis of mutual consideration of interests and security.

The defensive thrust of Soviet military doctrine is reflected in our peace initiative, in particular in a program calling for total elimination of nuclear and other types of weapons of mass annihilation by the end of this century, reduction of conventional arms to a minimum, and limitation of the military potential of the parties to a degree of sufficiency which ensures performance only of defensive missions.

The Soviet Union, in full agreement with the other Warsaw Pact member states, considers the continuing split of Europe into opposing military blocs to be an abnormal situation. We advocate simultaneous dissolution of the NATO alliance and the Warsaw Pact and, as a first step, disbandment of their military organizations. We are for an open comparison of the military doctrines of the Warsaw Pact and NATO, of the USSR and the United States.

In the Soviet view a practical path toward implementation of the defensive strategy concept of the principle of arms sufficiency lies through manifestation of military restraint, together with the United States and the other NATO countries, through negotiations, and agreed-upon actions, such as the INF Treaty. A balance should be maintained at present arms levels without detriment to anybody's security.

The position of the USSR has been expressed clearly and precisely on all these issues. And it is not surprising that this position wins approval and trust not only in countries friendly to us but also in those circles in which until recently the Soviet Union was viewed as an "evil empire."

What is the reason for this anti-Soviet rhetoric? First and foremost it is a matter of old political thinking, distrust, and devotion to "the countenance of the enemy" embodied in the USSR, elaborated over the course of decades. And obviously another reason is the differing views on defensive military doctrines and their definition. U.S. Secretary of Defense Frank Carlucci, for example, is inclined to consider the existence of airborne troops in the USSR a sign of an offensive doctrine, but he considers the U.S. rapid deployment force, which exceeds many times over the numerical strength of the Soviet airborne troops, to fall within the defensive category. In the opinion of the Pentagon, Soviet tanks are an offensive weapon, while U.S. carrier task forces are defensive, since they are tasked with "protecting lines of communication, trade and commerce." And, finally, the U.S. has declared SDI to be defensive in nature. A strange gradation. Does its true significance, however, not lie in using it to conceal one's intentions and to gain unilateral advantage?

There are grounds for doubts. The military doctrines of the imperialist countries, including the United States, have been hallmarked by an endeavor to conduct forceful confrontation. On their part a military threat toward the USSR became a constant. It was noted at the 19th All-Union Party Conference that this military threat still remains today. A strategy of "direct confrontation" with the Soviet Union forms the basis of U.S. military doctrine for the 1980's. The military-technical aspect of this

doctrine finds expression in the strategies of "flexible response" and "nuclear deterrence" adopted by the United States and NATO. The thrust of these strategies is military preparations of any type and any scale.

Let us face realities. Just what is the Strategic Defense Initiative, for example? One of the main objectives of SDI is to secure a capability for and a high effectness of a nuclear first strike launched from space. An entire series of weapons based on new physical principles is being developed within the framework of this program: X-ray lasers with nuclear blast radiation pumping, microwave-energy weapons, high-velocity cluster projectiles, optical and laser-guided bombs, nuclear devices with enhanced electromagnetic pulse, gamma radiation munitions, etc.

Work is in progress on development of third-generation nuclear weapons which will surpass presently-existing weapons in destructive force and element of surprise. A combined directed-energy strike weapon is under development which would be capable of instantly destroying entire areas on the Earth's surface.

U.S. scientists themselves state that the SDI program has no relationship to defense. It is tasked with providing protection, but only after it delivers a nuclear first strike.

Still remaining in force is the "comprehensive strategic program" which calls for 100 MX ICBMs becoming operational by 1989, and 1,000 highly-accurate mobile Midgetman missiles by 1996. The B-1B strategic bomber (100 units) will enter service, joining the B-52 strategic bombers (194 units). All these aircraft will be capable of carrying hundreds of cruise missiles.

Here is another fact. A special U.S. Department of Defense team is working on development of a "strategy of competition," the aim of which is to make maximum use of Western technologies, scientific and technological advances to develop highly-effective weapon systems.

In particular, it is planned to utilize within the framework of a "strategy of competition" an upgraded B-52G strategic bomber capable of delivering disabling missile and bomb strikes from hostile air defense standoff range, using the F-111 fighter-bomber to deliver deep strikes on targets of particular importance, and using the dual-role F-15E tactical fighter-bomber for battlefield air interdiction. These aircraft would be fitted with modern equipment and armament.

Work is presently in progress on upgrading the F-16. The goal is to improve its combat performance characteristics, to enhance the aircraft's capabilities to conduct modern air-to-air combat, to provide the pilot with a greater volume of information on the air and ground environment, to increase the reliability of threat warning systems, etc.

Considerable attention is also being devoted to high-speed, reliable and highly-accurate detection, command and control, communications and data processing systems which ensure effective employment of weapons and delivery systems.

The Pentagon is planning to increase computer speed by a factor of hundreds and thousands over the course of a decade and on this basis to achieve a qualitative leap forward in the combat effectiveness of all types of weapons and combat equipment, and to change the entire armed forces command and control system.

The so-called "balanced technology initiative" and "conventional arms defense initiative," which essentially involves uniting the efforts of the United States, the other NATO countries and Japan for the purpose of arms modernization, are also aimed at achieving military-technical superiority over the Armed Forces of the USSR and the Warsaw Pact.

All these "strategies," "concepts," "theories," and "initiatives" call for a nuclear weapon first strike capability and in fact are leading to escalation of the arms race, development of new offensive weapon systems and undermining of security. They comprise U.S. military doctrine. As is evident from the cited facts, it is by no means directed at securing stability but at achieving total and undisputed military-technical superiority and at aggressive actions. In combination with other factors, U.S. military doctrine is seen far from in the rosy light which Pentagon officials are trying to cast on it.

As already stated, the Soviet Union and the Warsaw Pact member states have proposed to the NATO countries that consultations be held for the purpose of confronting and comparing military doctrines. The purpose would be to eliminate distrust and to ensure that military doctrines are grounded exclusively on defensive principles. The West is dragging its feet, however. The reason is apparently the fact that objective comparisons of the two doctrines would turn out not to be in favor of NATO.

Aircraft Maintenance Procedures Intermediate Inspection Checks Urged

91441105m Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 32-33

[Article, published under the heading "Advanced Know-How Put Into Practice by Aviation Engineer Service," by Lt Col P. Karpenko and Lt Col Yu. Kuzmin, candidate of technical sciences: "Operation-by-Operation Inspection: Quality Reserve Potential"]

[Text] How can one assure a high degree of aircraft combat readiness and reliability, spot and correct a defect or malfunction in a prompt and timely manner?

Unquestionably an important role is played by completeness, proper sequence, quality and flawlessness of aircraft maintenance procedures performed by technician personnel. In connection with this one can scarcely exaggerate the importance of inspection and verification following completion of a given maintenance procedure. It consists essentially in selecting and performing inspection procedures following completion of the most critical phases of maintenance sequences which can result in mistakes.

Practical experience indicates that departure from the provisions of verification inspection following completion of a specified maintenance procedure can lead to undesirable consequences.

Fairly recently the following incident took place in a training subunit. The continuing good weather and intensive pace of student pilot training flights forced the men to make use of all reserve capability. Working within an extremely tight time frame, aviation engineer service personnel replaced worn-out engines. In the fueling area maintenance personnel were firing up and testing the engines on several aircraft, thoroughly checking them with a special automated system which provides capability to determine engine operating condition, to evaluate condition and status of aircraft systems and the quality of performance of installation, setting and adjustment procedures.

After connecting the power and test instrument cables to the aircraft, aircraft inspection and maintenance group chief Capt V. Serov climbed into the cockpit. The order was given to start the engine. Operator WO N. Mashkov closely monitored equipment operation. The engine smoothly transitioned to idle and... went out of control. Some mysterious force was advancing the throttle. Applying considerable effort, Serov returned the throttle to the idle stop and cut the engine.

The malfunctioning aircraft was towed away from the fueling area. They proceeded to check out the next aircraft. This time, after starting up the engine and throttling to idle, turbine wheel rpm was running 20 percent above maximum allowable. And it remained constant when the throttle was moved. Once again they had to shut down the engine.

This was reported to the regimental deputy commander for aviation engineer service. On his instructions, engine start and runup on the other aircraft was suspended. The painstaking task of finding the causes of the malfunctions began.

As we know, such malfunctions are possible only if there is a problem with the fuel regulator, but prior to entering service the powerplants were bench-tested and showed no problems; the replaced engines had also operated normally. Why did these malfunctions crop up?

Engine Control Rod-Fuel Regulator Linkage Assembly

Analyzing the entire engine control system element by element, from throttle to regulator pump control valves, the maintenance people concluded that the malfunction could have been introduced into the control system during performance of adjustment procedures at the airframe-powerplant linkage point.

The fact is that both the engine and the fuselage bay which houses it have certain tolerances to maximum dimensions. The combinations of these dimensions are of a random nature when an engine is replaced. Adjustment devices are provided in order not to change engine control system characteristics.

One feature of the control system on the combat trainer aircraft flown in the unit in question is the presence of two adjustment devices on the fuel regulator (see figure). Upper adjustment screw 1 adjusts the position of fuel regulator control arm 4 in relation to shutoff valve 3, while lower adjustment screw 2 adjusts the position of indicator 5. If the system is adjusted with the lower adjustment screw, there occurs not only displacement of the control arm but also turning of the shutoff valve.

Depending on how much the lower adjustment screw is turned, this procedure can result in "disappearance" of the idle area and increase in throttle setting (in the former case) or only in regulator readjustment (in the latter case). During operational maintenance adjustment with the upper adjustment screw is permitted. If the screw adjustment limits are insufficient, further adjustment of the control system is performed with adjustments further up the control linkage.

Senior aircraft mechanic WO V. Zavyalov, however, who was installing the control system, brought throttle position and fuel regulator indicator into agreement using only the lower adjusting screw, thus introducing a misadjustment into the fuel regulator.

This incorrect adjustment procedure should have been spotted and prevented by Senior Technician Lt V. Volkov. But he "omitted" this step in the operation-by-operation inspection and verification procedure. He

performed an installation inspection at the final phase of engine control system installation on the basis of the position of the control stick and the indicator on the fuel regulator, which were within specs.

By decision of the regimental deputy commander for aviation engineer service, quality of performance of adjustment procedures was checked on the remaining aircraft, and discovered problems were corrected. The aircraft performed satisfactorily on the post-maintenance check flight.

This incident was examined in detail at a technical critique and analysis session. Particular attention was devoted to the method of determining and performing maintenance procedures intermediate inspection checks. It was noted that first and foremost aircraft maintenance personnel should be thoroughly familiar with the construction and operation of components (function, location, connection and linkage). They should thoroughly master maintenance operations prescribed by the appropriate technical maintenance documents (servicing procedures, maintenance procedures checklists, maintenance bulletins, shop manuals).

They then examined specific operations pertaining to servicing, routine maintenance, installation and takedown procedures in order to determine possible mistakes by maintenance personnel. Only if a maintenance procedure is 100-percent error-free is it not included on the maintenance procedures inspection checklist.

If this cannot be guaranteed, the inspection procedure must be added to the maintenance procedures intermediate inspection checklist.

Only as a result of a properly organized maintenance procedures intermediate inspection system and precise performance of inspection can we prevent mistakes by aviation engineer service personnel during performance of aircraft maintenance procedures and substantially reduce the number of equipment failures and malfunctions, thus improving the level of flight operations efficiency and flight safety.

New X-ray Weld Inspection Device, New High-Strength Threaded Fastener

91441105n Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) p 33

[Article, published under the heading "Innovators at Work," by Maj A. Sekachev: "Difficult Quest"]

[Text] **X-Ray Inspection of Welds**

Cylindrical and tubular welded structures are extensively employed in today's aircraft industry. Due to their awkward location, as a rule access presents certain difficulties. Welds are inspected by a traditional method—through two walls. But this method is not always reliable. Specialists were faced with the problem of ensuring reliable inspection of the welds on such structures.

How can the best quality of inspection be achieved? Innovators gave thought to this question, and here is the result. A new device was recently displayed at the Invention and Efficiency Innovation-88 Exhibit at the Exhibit of Achievements of the Soviet National Economy, a device which makes it possible fairly successfully to inspect welds. It is essentially a simple but very effective device. Another advantage is the capability to perform X-ray inspection of welds through a single wall, and with a high degree of quality.

They Have Improved... Screw Threads

Screw threads and their original prototype—Archimedes' screw—were first placed in the service of man in deep antiquity. And to the present day practically no device could get along without threaded bolts and nuts. Their reliability determines in large measure the strength and quality of machine tools and a vast number of diversified machines, including aircraft. As we know, failure of fasteners begins as a rule at the first turn of the threads. As a result of this a nut or bolt becomes unserviceable.

Recently a team of specialists at an aircraft design office developed a high-strength threaded fastener. The new fastener design makes it possible to distribute the load more uniformly among the thread turns and, what is very important, substantially to reduce stress on the first turn.

Utilization of this new fastener design will increase severalfold the service life of a high-strength threaded fastener over existing bolts and studs. This will produce considerable technical and economic effect and will increase the service life of machinery and equipment. Another valuable factor is the simplicity of design. Cutting the new threads does not require special thread-cutting tools or a more complex process.

This high-strength threaded fastener is designed to operate under tensile stress with variable loads in machine assemblies and components of any type.

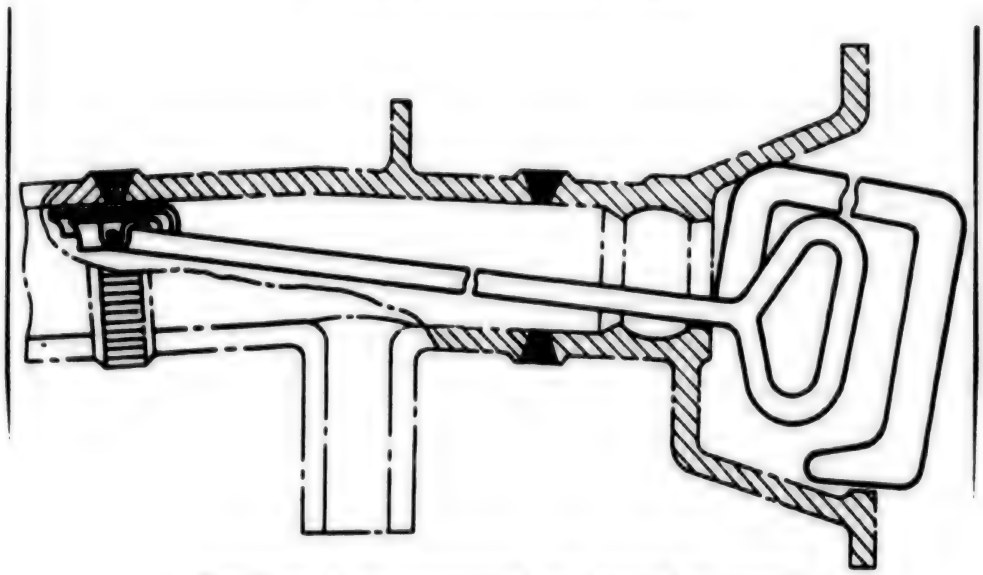
Rescue of Downed Helicopter Crews in Afghanistan

91441105o Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 36-37

[Article, published under the heading "We Are Internationalists," by Maj V. Zdanyuk: "Adopted Brothers"]

[Text] The heavy veil of fog hanging over the airport began to thin out.

Device for X-ray Inspection of Welds



Устройство для рентгеноконтроля швов сварных соединений.

Pilots, navigators, and crew chiefs came to life: flight operations would be commencing soon.

Suddenly the distant rumble of helicopter engines could be heard. A few minutes later a helicopter came trundling down the taxiway, its rotor blades scattering wisps of fog.

"It appears our neighbors have come to visit us," said one of the flight personnel gathered by the control tower.

The helicopter door opened, and two men hopped down onto the ramp. The third crew member proceeded to deploy the boarding steps. The newly-arrived aircrew headed over toward the tower.

"Tagir!" exclaimed flight technician [crew chief] Sr Lt Vladimir Skachkov, who was standing with the group of flight personnel, and ran toward the new arrivals.

One of the arrivals, a short, solidly-built, dark-complected fellow, broke into a smile and, holding his hat in place with one hand, proceeded to run toward Skachkov.

"Skipper...."

"Volodya.... Long time no see."

"They flew together in Afghanistan!" exclaimed one of the pilots. He then added in a lower voice: "They had quite an experience down there...."

On that memorable day they had taken off at dawn as a two-ship element, their destination a distant airstrip high in the mountains. They were carrying ammunition, rations and drinking water for a small garrison which was guarding a road across a pass from the dushman [mujahideen]. The aircrews had flown to this "eagle-height" airstrip in the past.

When they were just one third of the way to their destination, the helicopter being flown by the wingman, Capt Yuriy Yevdokimov, received fire from the mountain terrain below and took a hit. The pilot made a forced landing. Capt Tagir Mugtasimov immediately reported the situation back to base by radio, requested a two-ship search-and-rescue helicopter element, and decided to proceed to his destination, off-load the supplies as quickly as possible, and return to help his comrades in arms. He landed his helicopter on a rock-cleared site. Crew chief Sr Lt Vladimir Skachkov opened the door and requested that the motorized riflemen unload the supplies as quickly as possible. Within minutes the job was completed. He then headed back to assist his comrades in arms....

Hugging the dark-brown, rocky terrain and swinging around dangerous areas, the helicopter swiftly descended into the valley. Yevdokimov's helicopter was emitting a radio signal. Tagir headed down the gorge, homing on that signal.

A kilometer from where the wingman had put down, Mugtasimov also began taking fire: two machineguns were firing from different directions. The pilot skillfully maneuvered, and then brought his helicopter level and

fired a salvo at a shallow rock shelter in the cliff face, where one of the machineguns was located. Vladimir fired off a long burst toward the mountaintop, where they could see dushman.

Suddenly the helicopter was shaken by a heavy blow. It was as if it had collided with an invisible obstacle; nosing down, it began plunging groundward. "We've been hit by a Stinger," the thought flashed through the crew chief's mind. The next instant he heard the aircraft commander's voice: "Jump!"

Copilot-navigator Sr Lt Vladimir Aleksyutin was the first out of the falling helicopter. As soon as he touched ground, he engaged the dushman. He was followed out of the wide-open doorway by Skachkov, who came down onto the steep slope plunging into the gorge. By the time he got to his feet, puffs of dust were kicking up all around him. An instant later he heard the chattering sound of a burst of automatic fire from an assault rifle. Skachkov bolted over to a large rock, hit the dirt, and looked around.

The bandits were about 200 meters away, on the mountaintop. A little bit to the right and below the spot where he lay, a parachute was sliding downward into the gorge. "The skipper!" Vladimir said to himself. Freeing himself from his own parachute as he lay sheltered by the rock, he kept Mugtasimov in view with the corner of his eye. Mugtasimov had landed badly: it looked like he had landed on his back, turned over, and then had slid down the slope. Had he been hit by dushman bullets? No, he was still alive. He had grasped hold of a bush and was attempting to crawl.

Skachkov decided to make his way down to the pilot. "He might be wounded or have hurt his leg landing," the worried crew chief said to himself.

He glanced out from behind the rock, fired off a burst with his assault rifle toward where he had previously spotted dushman, and then proceeded to roll head over heels down the slope. He heard a burst of assault-rifle fire nearby: the copilot was pinning the bandits to the ground. The dushman responded with uncoordinated fire, but it was too late: Skachkov had succeeded in getting across the most dangerous stretch of open ground. He again hit the dirt behind rocks, returned fire with short bursts, and once again took off down the slope.

Soon he caught sight of Mugtasimov. The latter had bruised his leg landing, but he was able to walk without assistance. And they were going to have to hike out of here, since at this location it would be difficult for the rescue helicopters to spot them. Discussing the situation, they decided to proceed across and up the slope, in a direction away from the dushman. Aleksyutin, who was lying prone behind some rocks, covered their withdrawal. They knew that they would not simply be left to their fate, that a search effort would be in progress. All they had to do was hold out until the arrival of the search-and-rescue helicopters.

As they headed toward the ridge, they heard bursts of assault-rifle fire back behind them: the copilot was cutting off dushman pursuit. Taking shelter behind rocks, they then proceeded to cover Aleksyutin's withdrawal. After this they again proceeded forward.

They succeeded in clambering almost halfway to the top. Even today Vladimir cannot say how much time this took. He remembers only that they were climbing with the last energy they could muster. Sweat was streaming into their eyes, and their mouths were as dry as cotton. But they scrambled upward, meter after meter.

Soon the slope became less steep, and at this point they again began to receive fire. Skachkov fell face down, hugging the hot ground. The pilot, who was lying nearby, emitted a groan. "I'm hit...."

Vladimir crawled over to him. The back of Tagir's jacket was ripped open and stained with blood. Skachkov pulled out his individual dressing pack and bandaged Mugtasimov. The latter was weakening fast.

But they were pinned down by dushman fire. Aleksyutin held position and continued delivering fire, while Skachkov, hoisting the pilot onto his shoulders, dragged him over behind some rocks. He lay prone alongside the pilot and proceeded to return fire, expending his ammunition as economically as possible, in short bursts. The bandits made several attempts to move in closer, but they were met with withering fire and crawled back in retreat.

"Volodya, I'll stay here," said Tagir, his voice weak. "I'll hold them off while you climb on up to the top, where you'll be spotted sooner by our people."

"We'll go together, skipper," Skachkov replied, and smiled encouragingly with his parched, cracked lips: "Just hold on a bit longer."

He once again slung Mugtasimov over his shoulder and, with the copilot providing covering fire, carried him up the mountain, trying to move him as painlessly as possible. After a few minutes he took a short breather and then headed out once more....

It seemed an eternity. The sun was now above the mountains, but they were still crawling on. A minute to advance one meter, then half a meter.... They continued crawling toward the beckoning ridge crest. Vladimir ran out of ammunition. Vladimir unfastened the pilot's spare magazine pouch, which contained additional AK magazines. He again returned fire and again crawled stubbornly up the slope, carrying Tagir on his back. For some reason Aleksyutin had fallen silent. This was new cause for alarm.

As they approached the ridge crest, Skachkov heard the rumble of engines. Soon two helicopters appeared, high above the ridge. They swept past at some distance, over where Capt Yu. Yevdokimov's crew had gone down, and then circled back. The lead helicopter, covered by his wingman, was coming down to land. A heavy machine-gun was firing at him. A tongue of flame, wreathed in clouds of smoke, surged skyward from the adjacent mountain and headed toward the helicopter.

"Stinger!" Vladimir's heart skipped a beat. He shut his eyes in helpless rage and bit his lip, bringing blood. A muffled explosion off in the distance brought him around again. There was a puff of black smoke above the highest peak. The helicopter, executing a steeply-banked turn, landed. The helicopter crew pulled Yevdokimov's crew members aboard. The helicopter took off and proceeded, in pair with his wingman, toward the ridge crest where Mugtasimov and Skachkov were waiting.

The helicopter soon spotted them, but there was no place to put down nearby: the slope was too steep. Pulling the pilot onto his shoulders, Vladimir staggered toward the helicopter, which had landed some distance from them. He paid no attention to the dushman bullets. He handed Tagir up to the crew chief and proceeded to head back.

"Where are you going? We're taking off!" the crew chief shouted, but Vladimir merely waved his arm. There was no point in explaining that Mugtasimov's assault rifle was still lying over behind the rocks: you couldn't hear a thing over the roar of the engines.

Skachkov ran over to where he and the pilot had taken shelter, grabbed the asault rifle, and ran back toward the helicopter. At this point he felt an overpowering sense of exhaustion. It was all he could do to grab the helicopter doorway. The crew chief had trouble dragging him aboard.

Sr Lt Vladimir Aleksyutin died a hero's death. His body was discovered by Soviet air assault troopers a week later, during a combat engagement. A burst of assault-rifle fire had riddled the officer's chest....

Receiving new duty assignments, Mugtasimov and Skachkov went their separate ways. Vladimir was assigned to another helicopter crew. Soon he was transferred to the Belorussian Military District. He was given a warm welcome in his new unit. They could see that this was a combat-toughened individual, a person who would not let you down. This was true. Skachkov is presently one of the best crew chiefs in the subunit.

Tagir Mugtasimov has recovered from his wound and is once again flying. He passes on his experience and skill to the young pilots. Their fellow soldiers call Mugtasimov and Skachkov adopted brothers. The circumstances in which they found themselves put their friendship to the test and, as has happened so many times in the past, the finest moral traits of the Soviet citizen and the excellent fighting qualities of our Air Force men were revealed in a most difficult situation.

Military Truck Drivers Taught to Drive Safely

91441105p Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 38-39

[Article, published under the heading "The Army's Strength Lies in Discipline," by Maj V. Nezhentsev, unit motor transport service chief: "Preventing Motor Vehicle Accidents"]

[Text] A practice alert sounded during the night, arousing the subunit under the command of Lt Col V. Afanasyev. The men dressed quickly, were issued weapons and gear, and hurried over to the truck park. What kind of mission would their commanding officer be giving them? They might be executing a march. The drivers were by now accustomed to the practice of making long-distance runs for the most part at night. Soon the order came: redeploy to support the operations of an adjacent subunit.

They quickly checked their trucks' principal components and assemblies, after which the truck convoy headed out toward its distant destination. The drivers now focused their entire attention on their gauges, on the lead truck's running lights, and on the headlight-illuminated road surface.

Driving a truck at the threshold of winter presents certain difficulties even during daylight. The first snowfalls, ground surface icing, and fog make motor transport operations much more difficult. But at night the road can present a great many additional surprises. Therefore motor transport personnel require exceptional discipline, organization, wary cautiousness, and the strictest obedience to orders and observance of traffic rules and regulations.

On this occasion the men had to travel a considerable distance on slippery roads. The route passed through populated localities and forest, and contained an abundance of steep grades, both climbing and descending. In spite of this, however, under the guidance of experienced specialist personnel Sr WO N. Polyakov, WO S. Chmyr, and other instructors, the drivers successfully accomplished the assigned mission.

What factors contributed to successful completion of this night movement? Good preparation for the motor transport movement was a significant factor. We have a hard-and-fast rule in the unit: before a driver takes his place behind the wheel, he must inspect the vehicle, accompanied by the vehicle ranking individual, checking to make sure that clutch, brakes, steering linkage, lights and horn are in proper working order, for every new

motor movement constitutes both nervous anticipation and encounter with the most varied situations en route. There is good reason for the fact that one frequently hears the following admonition from those who have spent many years behind the wheel of a truck: "When you get behind the wheel, double your attention and triple your discipline."

Other factors promoting a successful military motor movement included strict driver observance of the requirements of military regulations and traffic rules. They responded quickly to the slightest changes in the road situation, were thoroughly familiar with signs and signals, and precisely observed prescribed speeds.

On our roads there is usually heavy traffic at all times. One frequently encounters bicyclists and people on foot. One may encounter steep upgrades, downgrades, as well as sharp curves. Driving is difficult under such conditions, especially in adverse weather.

Once I witnessed the following incident. On a slippery stretch of road a driver suddenly applied his brakes hard just before a curve. Naturally the truck began to slide. Instead of releasing the brakes and turning the wheel in the direction of rear-wheel skid, the driver continued braking. This caused the truck to swing around and end up crosswise on the road surface.

Fortunately the incident ended without damage or injury. But one had to ask: why does such a thing happen? Due to ignorance or confusion? In my opinion both factors are involved, for lack of proficiency always engenders a lack of confidence, and in order to eliminate this "gap," we adhere strictly to the requirements of accident-free motor vehicle operation. We carefully select drivers and seek to ensure that they are constantly improving their technical and specialized knowledge, that they thoroughly master and unswervingly observe traffic rules and regulations. And we of course conduct purposeful indoctrinational work with personnel.

Our command personnel and political workers become acquainted with the future drivers during basic training and during specialized training courses. This provides the opportunity to become better acquainted with each man's individual characteristics prior to the time he is given a job assignment and is certified to drive a truck. During this period special attention is devoted to the men's discipline and follow-through.

Individual selection of drivers and daily efforts to instill excellent moral-political and psychological qualities produce good results. The men more strictly observe rules, regulations and procedures pertaining to truck servicing and operation, and they make fewer mistakes. This is only one aspect, however. Another, no less important aspect is continuous improvement of the drivers' job skills, for accident-free motor transport operations depend in large measure on skilled organization of the specialized and technical training of driver personnel.

The specific nature of the work performed by military motor transport personnel, especially those who drive motor transport vehicles, demands a serious, thoughtful approach and innovativeness on the part of command personnel to improve methods of training personnel. In our unit, for example, alongside group training classes, considerable attention is devoted to organization of work with individuals. If, for example, a motor transport vehicle driver has missed scheduled classes, he is worked with separately. It has become traditional practice for platoon commanders to give individualized training assignments to their men.

We also have a serious attitude toward self-instruction or individual self-training, which for the most part is conducted in the evening. In this case each driver is assigned a specific task. Officers or warrant officers direct this individual self-training in conformity with a schedule approved by the commanding officer. As a rule they act as training class organizers, total up performance results, and assign marks to their men.

We keep an eye on organization of assistance to specialist personnel with poor preparation in theory and inadequate driving experience. The company or platoon commander works personally with them. They give recommendations on what literature to read during individual self-instruction, help the men understand complex technical matters, and instill in the men a strong sense of responsibility for prompt and timely performance of technical inspections and other preventive measures. Our drivers take part in technical study groups, take active part in conferences and training-aid quiz games, hold question-and-answer evenings, as well as competitions in practical driving and correcting various malfunctions on the equipment.

And, of course, we take particular care with selection and training of passenger car drivers. Toward this end, shortly prior to discharge of a veteran driver from the military, we assign a novice driver to his tutelage; for a period of 10-12 days the novice driver studies traffic rules and procedures as well as the peculiarities of road traffic in the city and adjacent areas, and familiarizes himself with the principal routes.

Concerning themselves with increasing the men's job skills, our command personnel, together with State Motor Vehicle Inspection and Military Motor Vehicle Inspection officers, devote considerable attention to a thorough analysis of the causes of motor vehicle accidents in town and in the oblast, on the basis of which conclusions are reached for the practical training and briefing of our drivers. At one training class, for example, a State Motor Vehicle Inspection officer discussed in detail the most typical causes of motor vehicle accidents which have taken place on the roads in our oblast. In particular, he pointed out that many of them involve violation of regulations pertaining to passing other vehicles and crossing uncontrolled intersections, although

traffic regulations are sufficiently clear on these procedures. He emphasized that accidents when passing other vehicles happen most frequently when the passing driver is unable to get back into his lane in order to avoid collision, even though he was not in violation of the law when he pulled out to pass. And, typically, the majority of collisions while passing are not with oncoming vehicles but rather with the vehicle being passed.

Close contacts with GAI [State Motor Vehicle Inspection] and VAI [Military Motor Vehicle Inspection] as well as constant consideration of their recommendations and advice enable our commanders and political workers to improve the men's professional skills, to synthesize and adopt advanced know-how, and to acquaint them with technical innovations in automotive engineering and advanced methods of vehicle operation and maintenance.

Every measure is organized and carried out taking into consideration the specific conditions in which the men are working. Recently, for example, matters pertaining to motor vehicle operation and maintenance in winter were discussed at a technical conference attended by our drivers. The unit commanding officer, officers A. Borisov, D. Managarov, and others who spoke at the conference discussed the specific features of operation of motor transport equipment during the cold part of the year.

Also interesting and content-filled, in the opinion of personnel and many of the participants, was a recent conference on accident-free motor vehicle operation. Drivers, subunit commanders, political workers, secretaries of subunit party and Komsomol organizations, spokesmen from GAI and VAI, as well as judge advocates were invited to attend this conference. Top drivers shared their experience and know-how in preventing accidents and potential accident situations and told how they broaden their technical knowledgeability. The conference attendees became acquainted with the equipment used in a standard classroom and at a vehicle inspection station, and they were shown training films on vehicle operation, servicing and maintenance.

A technical lecture agency operates under the auspices of our unit club facility. Two or three times a month they present lectures and reports on successes in perestroyka in this country and the missions of our fighting men, on development of the automotive industry in the current five-year plan, and on expert driver advanced know-how. Special technical bulletins are put out, and radio programs are presented for military drivers.

Competition for further improvement of job skills, efficient and high-quality performance of assigned tasks, economical consumption of tires, fuel and lubricants, and on extending time between maintenance has been extensively organized in our subunits. Competition results are totaled up on a regular basis, and progress in meeting pledges is frequently discussed at party and Komsomol meetings. Results are publicized by means of visual agitation materials.

Competition among drivers for accident-free driving, excellent care and safeguarding of vehicles is coming along well. Results are determined by each man's total accumulated points, which are posted for each working day. Comments by the equipment inspection station chief, as well as vehicle checks and inspections by VAI or GAI personnel, their comments on driver trip tickets, as well as other vehicle operation performance standards are considered in rating competition performance. This has a positive effect on end results.

Patriotic initiatives by vanguard specialist personnel on improving thrift and economy of vehicle operation, directed toward achieving conscientious observance of traffic rules and regulations, are widely supported in our unit.

Avionics Maintenance on Need-to-Repair Basis at Aircraft Maintenance Depots

91441105q Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 40-41

[Article, published under the heading "Innovations in Aircraft Maintenance," by Col V. Doroshkov and Maj S. Gritsevskiy, candidates of technical sciences: "Repair As Needed"]

[Text] **"As soon as enterprises begin seriously addressing the matter of improving organization of labor and labor incentive, increasing discipline and demandingness, reserve potential is discovered, the existence of which had not even been suspected."**

From the proceedings of the 27th CPSU Congress

* * *

Until recently there were two principal types of maintenance performed at Air Forces aircraft maintenance depots [aircraft overhaul enterprises, aircraft rework facilities]: medium repairs or medium-level maintenance, and major repairs or major overhaul. For aircraft avionics the maintenance procedures process included disassembly, visual, optical, and test-instrument aided preventive maintenance inspection, repair or overhaul proper, as well as specifications check, testing of assembled devices, and submission to final technical inspection.

This approach to organization of maintenance for early-generation aircraft avionics was warranted because of the poor reliability of the equipment and the existence of a large number of components and assemblies with a

limited service life. Also required maintenance labor was relatively small in comparison with the overall labor-intensiveness of repair and overhaul of the airframe and its components.

Maintenance personnel at aircraft maintenance depots (ARP) encountered certain difficulties when they began working on the avionics of third and subsequent-generation aircraft using the traditional sequence. Among the principal difficulties we should note the increased material expenditures connected with the fact that in order to set up major overhaul or medium-level maintenance it was necessary substantially to increase production facilities and capability (work areas, equipment, number of personnel). It would seem that greater expenditures on maintenance should increase after-maintenance reliability. Experience has indicated, however, that performance of overhaul and maintenance following the existing processes and procedures at maintenance depots fails to accomplish this task. The fact is that employment of new principles of avionics design in new-generation aircraft, increased mounting density of components, as well as the existence of complex functional linkages within and between components make disassembly and assembly more difficult, not to mention the increased difficulty of mandatory replacement of components and assemblies. All this adversely affects reliability.

The principal causes include physical wear on structural components in the process of disassembly-assembly and the introduction of additional faults and misadjustments. Misadjustments have the most adverse consequences, since in connection with the complexity of the functional linkages of electronic equipment, change in parameters in just one assembly frequently requires realignment of the entire device, and sometimes the entire system. One should also bear in mind that in the ARP environment it is frequently impossible either to detect or correct loss of performance specifications (one of the consequences of misadjustments).

The most effective way to increase aircraft after-maintenance reliability in present-day conditions is adoption of new diagnostic methods into maintenance procedures, methods which make it possible to predict the condition and status of equipment for an extended period of time. Scientific and technological advances have provided a foundation for this, especially in the field of microcomputers. This is a priority-emphasis area for increasing the effectiveness and efficiency of maintenance depot operations. Another, no less important task is to provide avionics repair and maintenance on the basis of resources actually available at ARP, with minimum material expenditures and labor outlays.

A system of repair as needed (RTS) has been devised to resolve these problems, a system which is already being adopted at ARP, particularly at the maintenance depots where the units headed by officers V. Klimenko, A. Olefir, V. Ustenko, and V. Pechenykh work.

From the standpoint of process and procedures, RTS constitutes maintenance the scope and volume of which is determined primarily by the state of working order of a piece of equipment on arrival at the maintenance depot. In certain instances routine maintenance procedures may also be performed, such as upgrade or update modifications and replacement of lubricant and replacement-scheduled components.

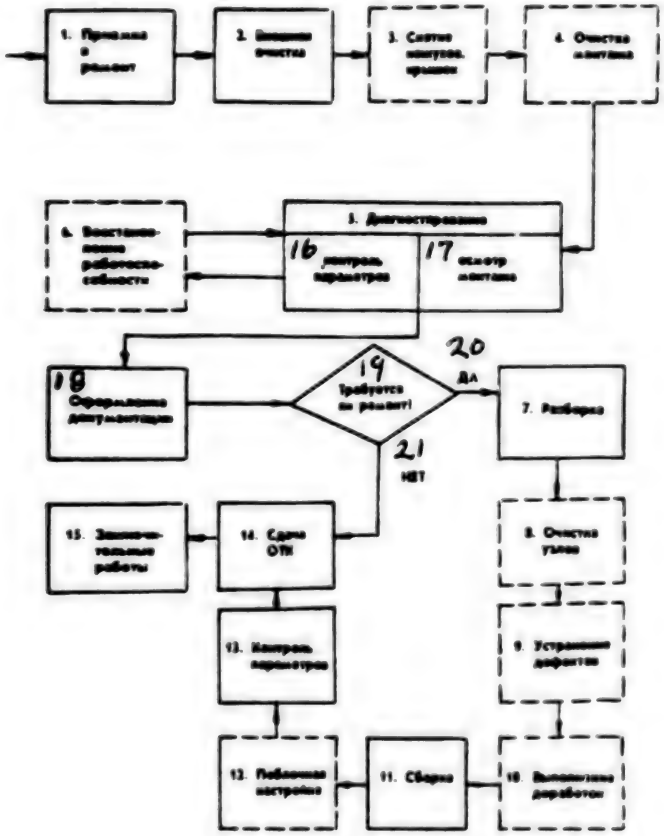
The accompanying figure contains a standard process organizational diagram for repair-as-needed aircraft equipment maintenance. Electronic devices as well as devices which contain electromechanical assemblies: engines, selsyns, clutches and couplings, etc receive maintenance and repair according to this scheme.

The steps of receiving for maintenance, cleaning exterior, and final procedures are pretty much standard. The key operation is diagnostics, that is, evaluation of the mechanical condition or state of working order of devices by means of visual inspection and checking parameters. Diagnostic procedures are performed by a highly-skilled specialist (diagnostician). He is the main person who determines the required scope of maintenance or repairs for each piece of equipment. In order to permit visual inspection of individual devices, easily-removed cases and covers are removed prior to performing diagnostic procedures and, if necessary, equipment is cleaned of dirt and corrosion (these procedures are indicated by dashed line in the diagram).

For example, here is how the maintenance diagnostician's work is organized in the shop supervised by Sr Lt V. Tishukov. Restoration of malfunctioning or unserviceable devices to good working order begins in the process of performing diagnostics: whenever possible, detected minor problems are corrected on the spot. More complicated malfunctions are source-pinpointed with maximum accuracy (to the module, printed circuit board, or even individual component) and are entered on the list of malfunctions determined by diagnostic tests. In order to shorten the time required to perform diagnostic testing, malfunctioning modules can be removed on the spot and replacement modules inserted. If no malfunctions are discovered or if malfunctions have been corrected during the process of diagnostic testing, the unit is submitted to final inspection by the technical inspection section and proceeds to the assembly shop (supply warehouse). Experience indicates that RTS is more effective when inspectors and maintenance technicians work with a personal stamp.

If it is determined that a piece of equipment needs repair, the diagnostic technician enters all repair procedures to be performed on a list of malfunctions determined by diagnostic tests, which is passed on to the repair bench along with the unit in question and which serves as the basis for determining repair personnel pay. The procedures marked on the diagram as steps 7-13 are performed in the repair section. If a malfunction has been pinpointed by the diagnostic technician down to a

Standard Diagram of Organization of Repair-as-Needed Maintenance Process



Key:
1. Receiving for maintenance
2. Cleaning exterior
3. Removal of cases and covers
4. Cleaning wiring terminals and printed circuits
5. Diagnostics
6. Restore to working order
7. Disassembly
8. Clean components
9. Correct malfunctions
10. Perform upgrade or update modifications
11. Assemble
12. Tune and adjust, module by module
13. Check parameters
14. Submit to final inspection
15. Final procedures
16. Check parameters
17. Inspect wiring terminals and printed circuits
18. Prepare documentation
19. Are repairs required?
20. Yes
21. No

component or assembly which cannot be repaired or which is not worth repairing, the diagnostic technician determines the extent of disassembly to be performed, whether cleaning of wiring terminals and printed circuits should be performed, whether upgrade or update modifications should be performed, the need for and extent of module-by-module tuning and adjustment, as well as those parameters which are to be checked after repairs are performed. If a malfunctioning component could not be pinpointed during diagnostic testing, this is done at the module-by-module tuning and adjustment phase, and the extent of testing following performance of repairs is determined by the nature of the malfunction.

The extent of checking and testing at step 13 (checking of parameters and after-repair adjustment) as a rule is less than during diagnostic testing and is specified according to the results of evaluation of the equipment's state of working order and procedures performed at steps 9, 10, and 12. Thus if following diagnostic testing a piece of equipment has been determined to be in good working order, the maintenance process is reduced to steps 1-6, 14, and 15, resulting in a substantial decrease in labor outlays (in relation to medium-level maintenance and major overhaul).

Naturally the described maintenance scheme cannot take into account all specific features of repair and maintenance dictated by the design of modern electronic equipment. The diagram applies to the most general, standard designs and specifies only general principles. The maintenance process applying to a specific piece of equipment is determined by the list of mandatory procedures performed when carrying out maintenance on a piece of equipment on a repair-as-needed basis. The suggested process can also be used to perform maintenance and repairs on electronic devices which are components of aircraft equipment and armament.

A number of maintenance depots have already begun performing maintenance and repairs according to the new procedure. The obtained results have demonstrated the high degree of effectiveness of this method. At the ARP under the command of Col V. Pechenykh, for example, it was established as a result of experimentation that RTS makes it possible to reduce by 16 percent the labor requirements of repair and maintenance, to reduce spare parts and materials expenditure figures by 75 percent and to reduce repair costs by 63 percent. As experience indicates, on the whole the adoption of RTS at various enterprises in the depot maintenance and repair of electronic gear makes it possible substantially to reduce the labor requirements of depot maintenance and repairs, especially on fourth-generation aircraft, and significantly to reduce consumption of spare parts and materials without worsening the level of post-maintenance reliability. And, most important, this leads to shortening of the maintenance and repair process and in the final analysis increases the operational readiness of Air Forces units and subunits.

In spite of the obvious advantages of a repair-as-needed approach, the widespread adoption of this process is being impeded by obsolete maintenance regulations and manuals. It is paradoxical, but fact: today the economic structure of aircraft maintenance depots is such that RTS is often not financially advantageous to an enterprise. This is particularly clearly evident in the example of economizing in spare parts. Since at the present time the cost of consumed spare parts is figured for the enterprise into the value of commodity output, achieving savings in spare parts reduces commodity output, and this adversely affects the economic indices of enterprise operations. The advantages of RTC can be fully realized only in the new conditions of economic management. But this requires that artificial barriers be eliminated as rapidly as possible and that securing high quality of depot maintenance and repairs at minimum expenditures is financially beneficial both to the Air Forces and to aircraft maintenance depots.

War Heroes From Afghanistan Conflict Portrayed in New Book

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[Book review, published under the heading "New Books," by Lt Col V. Nekrasov: "Men With a Strong Sense of Duty"]

[Text] A book recently published by the Military Publishing House of the USSR Ministry of Defense ("Zvezdy slavy boyevoy: na zemle Afganistana" [Stars of Combat Glory: On the Soil of Afghanistan], compiled by I. M. Dynin, Moscow, Voyenizdat, 1988, 224 pages, illustrations, 65 kopecks) tells the story of many of those who have earned fame by their deeds on Afghan soil. Hero of the Soviet Union Army Gen V. Margelov writes in the preface: "As I was reading the stories in this volume, the heartfelt words spoken by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, to the delegates to the 20th All-Union Komsomol Congress about our internationalist fighting men came to mind, and his appeal actively to utilize examples of their courage, valor, and heroism in patriotic and internationalist indoctrination."

Each documentary account of a heroic deed on Afghan soil is a most persuasive testimony to the staunchness of our fighting men, their faithfulness to duty and their love for the homeland. Present-day Soviet youth has inherited these qualities from the older generations. Komsomol members and young Communists should pass them on like a relay baton to their children and grandchildren.

This book is the second in a series, following a volume of stories entitled "Zvezdy podviga" [Exceptional Feats of Valor], also published by Voyenizdat. Stories about Heroes of the Soviet Union pilots Vitaliy Pavlov, Petr

Ruban, Sergey Filipchenkov, and Yevgeniy Zelnyakov, and men of other branches of the military Ruslan Aushev, Igor Chmurov, Nikolay Shornikov, Aleksandr Koryavin, Fedor Pugachev, Nikolay Kuznetsov, Nikolay Kravchenko, Igor Zaporozhan, Viktor Kapshuk, and Vladimir Neverov were added to the literary gallery of portraits of internationalist fighting men who have received the homeland's highest honor.

The stories dedicated to famed pilot-internationalists will unquestionably arouse interest on the part of the Air Force reader.

Ground-attack squadron commander Lt Col P. Ruban lived a short but eventful life. He served about five months in Afghanistan. He took part in several large-scale combat operations to destroy dushman [mujahideen] bands. He led strike elements into combat practically daily, always taking upon himself the most difficult and dangerous missions. The flying, tactical, and weapons delivery skills of this squadron commander and his men were greatly appreciated by the ground troops. When in need of air support, Soviet and Afghan commanders would frequently request: "Give us 141". And "141" (Petr Vasilyevich Ruban's radio callsign) and his winged warriors would hasten to the designated area.

While flying a sortie in January 1984, Ruban's aircraft took a crippling hit. The pilot ejected, but he was too low for the parachute canopy fully to deploy. In the story titled "The Hero Lives on in Our Deeds" the life, military service, and combat experiences of this valiant squadron commander are retold in the words of his family, loved ones, and fellow soldiers, revealing the spiritual sources of this hero's courage, skill, and devotion to military and internationlist duty.

The outstanding flying and command qualities of Col (now Maj Gen Avn) V. Pavlov were revealed in their full glory in the flaming skies over Afghanistan. Vitaliy Yegorovich proved to be a bold experimenter in tactics of employment of army aviation and a skilled organizer of combat coordination of helicopters with Soviet and Afghan ground units and subunits. A workhorse by nature and an analyst by intellect, he was a combat innovator. The tactical and operational-level missions in the planning and execution of which Col V. Pavlov and his men took part as a rule ensured effective operations by air and coordinating ground troops against dushman forces.

A convinced advocate of the truth that by duty and conscience the commander should be the first and best pilot in his unit, Vitaliy Yegorovich worked constantly to improve his flying and fighting skills. In Afghanistan he earned the military pilot-expert marksman proficiency rating, flew more than 300 combat missions, and on many occasions personally led airstrike forces of various composition and mission tasking.

The homeland had high regard for the military labor, courage and heroism of this Communist and internationalist fighting man, awarding Col V. Pavlov the title Hero of the Soviet Union. The story entitled "Flaming Skies" will help the reader become more closely acquainted with this man of fascinating destiny and high sense of honor.

The story entitled "Ordeal" contains the following incident. At a get-together with students at the helicopter pilot school from which he had graduated, Capt Sergey Filipchenkov, on leave from Afghanistan, was asked: "How does one become a Hero of the Soviet Union?"

"By carrying out one's military duty to the homeland in an honorable and upright manner," the officer replied.

At the time he had no inkling that within six months time he himself would be wearing the Order of Lenin and the Gold Star Medal.

Filipchekov flew approximately 400 combat missions during his tour of duty with the limited Soviet forces in Afghanistan, risking his life daily, sometimes barely managing to nurse his crippled helicopter back to base. But on not one single occasion did his crew return without having carried out its mission.

"He is reliable, bold, and determined. If I were to go out on a reconnaissance mission, I would not hesitate to take Sergey along," Capt Viktor Yermakov commented about his wingman.

The hero of the story "Degree of Reliability," Lt Col Ye. Zelnyakov, was born to the family of a Great Patriotic War combat veteran pilot. Upon graduation from the Syzran Higher Military Aviation School for Pilots he did a tour of duty in the Far East, in the Separate Helicopter Regiment imeni V. I. Lenin, and was subsequently stationed in Belorussia. At his persistent request, he was assigned to duty in Afghanistan. He showed himself to be a bold, skilled combat pilot and commander. For courage and skill displayed during performance of his internationalist duty, Yevgeniy Ivanovich Zelnyakov was awarded the title Hero of the Soviet Union. He was also awarded the Order of the Red Star and the Distinguished Service Medal.

Internationalist fighting men who have distinguished themselves on the ground and in the air over Afghanistan are vividly portrayed in this new book. They merge to form a collective portrait of the enlisted man and officer of the USSR Armed Forces—our contemporary. Men of a high sense of honor, by their combat exploits they persuade the reader that there is always room in life for heroic feats of valor.

This book is intended for the general reader.

National Space Programs in Southern Asia, Australia

91441105s Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 11, Nov 88 (signed to press 5 Oct 88) pp 44-45

[Article, published under the heading "Readers Request," by D. Goldovskiy: "Space Program in the Countries of Southeast Asia and Australia"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction; based on materials in the foreign press]

[Text] **India is the only country in this region with its own space program. Pakistan is planning to build its own space hardware, while Indonesia and Australia are paying for the use of other countries' satellites and launch vehicles. The other states in this region have no plans of space program involvement in the near future. In this article the author does not address space research being conducted in China and Japan, since reports on these programs have been presented to our readers in past issues.**

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India is a rare and perhaps even unique example of a developing country which, not having yet solved acute economic, social, and political problems, has proceeded to establish its own space program. The government provides comparatively generous funding for the space program, and by no means out of considerations of prestige. It believes that without such spending it is impossible to bring Indian science and technology up to the level of world standards.

In order to acquire the necessary experience and know-how, since the 1970's India has been extensively engaged in a cooperative effort with the leading space powers, particularly the USSR and the United States. This made it possible to design and build India's first space hardware.

Of particular importance for this country are satellite communications, weather data, and data on natural resources. Satellite communications helps "enlighten" people in the most remote and inaccessible localities and to provide "remote" medical consultation. Weather satellites provide advance warning of monsoon rains, floods and other natural disasters. Information obtained from Earth resources satellites is exceptionally important for agriculture and forestry, fisheries, land use, and demographic studies.

Indian specialists conducted testing of the communications satellite system infrastructure and ground facilities with the aid of an American (ATS 6) and an Italian (Sirius 1) geostationary satellite. Indian scientists subsequently designed and built their own experimental communications satellite, EPPL, which was boosted into orbit on 19 June 1981 by a West German launch vehicle. It was only partially operational, however, since one of the two solar panels on the satellite failed to deploy.

Following this preparatory work, India placed an order with the United States for four Insat (Indian Satellite) satellites weighing approximately 1,200 kg each, which were to provide communications and weather information. Two satellites were launched into orbit in 1982 and 1983. One of them suffered interruptions of service and was short-lived, and India demanded that the Americans make good. Launch of the third Insat was scheduled for 1986. The United States proposed that India select an astronaut to fly aboard the space shuttle which would be deploying the Indian satellite. Two astronaut candidates—Bhata and Radhakrishnan—were named, employees of the Indian Department for Space. The Challenger disaster thwarted these plans, however. Now they are not even considering launching an Indian satellite with the space shuttle or carrying an Indian astronaut aboard the space shuttle.

The Soviet Union has proven to be a more reliable partner in this respect. The Soyuz T-11 spacecraft was launched on 3 April 1984, carrying an international crew which included Indian cosmonaut Rakesh Sharma. The crew transferred over to the Salyut 7 Soviet orbital space station, working aboard the station to 11 April.

But let us return to the Insat satellite. The third satellite of this series was launched into orbit on 21 July 1988 by a West European Ariane rocket, while the launch of a fourth satellite is planned for 1989, to be launched into orbit by an American Thor-Agena Delta booster. The U.S.-built Insat satellites are of the model Insat-1. India plans to develop in the 1990's its own Insat-2 series communications satellites, incorporating in particular the experience and know-how gained during development of the EPPL experimental satellite. West European Ariane boosters are to be used to launch the first two satellites of this series into geosynchronous orbit, while Indian-developed GSLV launch vehicles are to be used for the next two in the series.

India has for years been successfully using Soviet rockets to launch its satellites. The most recent launch (IRS-1A) was on a commercial basis: India paid the USSR 7.5 million dollars, signaling the beginning of the "economic accountability era" in the Soviet space program. The first Indian satellite, the Ariabhata, was launched into orbit by a Soviet rocket on 19 April 1975. The purpose of the launch was to investigate the ionosphere, the Sun, and galactic radiation. This was followed by the launches of the Bhaskara 1 (7 June 1979) and the Bhaskara 2 (20 November 1981) satellites, which were designed not only to conduct scientific research but also to perform remote sensing of Earth resources. On 17 March 1988 the Soviet Vostok booster commerical-launched the first operational Indian IRS-1A earth resources satellite. It carries three TV cameras. India plans to launch subsequent satellites of this series with Indian-developed PSLV launch vehicles.

While other countries, particularly the USSR, gave considerable assistance to India in developing its first satellites, the IRS-1A satellite was developed almost fully

independently by India. India has also designed and built the small Rohini (Star) and SROSS satellites with its own resources. The former, weighing 30-40 kg, is designed primarily for flight-test monitoring onboard systems on the India-developed SLV-3 booster, while the latter is to be used for scientific research, although the SROSS 1, just as the Rohini, was used for operational development of the ASLV rocket's onboard systems.

The launch vehicle designations SLV-3, ASLV, PSLV, and GSLV are abbreviations for "Satellite Launch Vehicle," "Advanced Satellite Launch Vehicle," "Polar Satellite Launch Vehicle," and "Geosynchronous Satellite Launch Vehicle" respectively. The latter three represent sequential development of the SLV-3. Development of the Indian SLV-3 launch vehicle and its successful launch of the Rohini satellite into orbit on 18 July 1980 made India the seventh member of the so-called "space club," the membership of which includes those countries which possess their own space hardware: USSR, United States, France, Japan, PRC, United Kingdom, and Israel.

The four-stage solid-propellant SLV-3 is capable of boosting a payload of up to 40 kg into a 400 km circular orbit. The ASLV can lift a payload of up to 150 kg into a 400 km orbit. The ASLV consists essentially of an SLV-3 with two solid-propellant booster stages. There has been only one launch of this launch vehicle to date, And it was unsuccessful—the first-stage engine failed to ignite. The PSLV launch vehicle is a four-stage launch vehicle with six booster units. The second and fourth stages are liquid-fuel. It is believed that this launch vehicle will be able to lift satellites weighing up to one ton into solar-synchronous orbit. It is to become operational in 1989, but this date may prove to be unrealistic in connection with the failed launch of the ASLV as well as certain technical difficulties. Finally, the GSLV launch vehicle, for which a hydrogen-oxygen motor is to be developed, is designed to boost a payload weighing in excess of 1 ton into a geosynchronous orbit, which will make India independent of other countries in carrying out its national space program. It is even possible that India will provide this launch vehicle to other developing countries on a commercial basis. The first launch of a payload with the GLSV is scheduled for 1993-1994.

Launching of Indian launch vehicles is to be done from a space launch facility on Sriharikota Island off the country's southern coast. The possibility of establishing a second space launch facility is under study. The Balasore area is considered to be the most suitable.

In 1986 Pakistan adopted a 10-year space program, which calls for development of two Paksat (Pakistani Satellite) communications and weather satellites, as well as a Pakistani launch vehicle. Pakistan is planning to develop the Bard-A experimental communications satellite with foreign assistance and to boost it into orbit with the Chinese Long March 2 rocket. A Pakistani launch vehicle is a thing of the distant future, since Pakistani rocket technology is just in its infancy, and the country as yet lacks the requisite technological foundation.

Indonesia needs satellite communications and weather observation systems as much as India and Pakistan, but it has no ambitious plans to develop its own space hardware. Indonesia purchases communications satellites from the United States. They have been christened Palapa (the symbol of unification in Indonesian mythology).

Two Palapa-A satellites were launched into orbit in 1976 and 1977, and the first Palapa-B went up in 1983. The second Palapa-B had a curious fate. It, just as the first, was placed into orbit by the space shuttle (3 February 1984), but efforts to transfer it from a low orbit into a geosynchronous orbit failed due to a malfunction of the orbital transfer vehicle. That same year the satellite was returned to Earth by another shuttle craft, and it is to be placed into orbit at a later date, but this time by regular rocket booster rather than by space shuttle. Indonesia will be forced to pay for the second launch.

The third Palapa-B satellite was lifted into orbit in 1987 by a U.S. launch vehicle, but not by the space shuttle, as had originally been planned. The same story with the astronaut was repeated: after the satellite was placed into orbit he was to conduct experiments in conditions of microgravity aboard the space shuttle. The astronaut candidate had already been approved—Prativi Sudarmono (a woman), a PhD and specialist in the field of microbiology and genetics. But the Challenger disaster caused these plans to be scrapped.

As for meteorological observations, Indonesia is placing high hopes on the TRMM satellite, to be jointly developed by the United States and Japan. Positioned in a close-to-equatorial orbit, it should provide coverage of a path extending from 30 degrees north to 30 degrees south latitude, that is, precisely that zone in which Indonesia lies.

Australia, in contrast to Indonesia and Pakistan, possessed two Australian-built satellites, which were launched into orbit by U.S. launch vehicles in 1967 and 1970. They were very small and were the result of a project initiated by Australian scientists. The first of these, called Vresat and launched for the purpose of investigating solar and cosmic radiation, weighed 50 kg, while the second one (Oscar-5), intended to be used by radio amateurs, was even lighter. These satellites represented an isolated episode and were not followed by additional development, since Australia presently lacks the technological foundation for developing space hardware.

Australia has subsequently followed the Indonesian path. It too has purchased satellites from the United States, and of the same type as Indonesia, with the

difference that it named them Aussat (Australian Satellite). Three Aussat-1 satellites were launched into orbit in 1985-1987, and two Aussat-2 satellites are scheduled for launch in 1991-1992.

The Woomera space launch facility is located in Australia. At the end of the 1960's and beginning of the 1970's it was used for test-launching West European Europe-1 rockets and British satellites. The Australian Vresat satellite was launched from this facility. In the mid-1980's Australia proposed construction of an international space launch facility in that country. If this comes to pass, it will be the most energy-efficient space launch facility in the region.

Cosmonauts Conduct Winter Wilderness Survival Exercise

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[Article, published under the heading "Cosmonaut Training," by Col I. Davydov: "Winter Forest"]

[Text] Hundreds of nuances lie hidden for each crew member within the customary phrase reporting the safe landing of a spacecraft, nuances which are fully perceived only by the cosmonauts themselves. For example, a soft landing is not really so soft. In addition, even if the landing is nominal, a spacecraft crew unfortunately cannot yet land into a painted circle with the accuracy of a parachutist. But what if the reentry and descent are not entirely nominal? We have had such situations. Here weather and climatic conditions at the landing location begin to play an enormous role.

The Soviet-French crew will be landing in winter. Over most of the USSR winter is characterized by bitter cold, snowfall, and blizzard conditions. The period of daylight is shortest in winter. For this reason both joint crews—the primary crew and the backup crew—are training for survival precisely in such conditions.

...A recovery capsule is lying on its side in the snow-covered forest. A white-and-orange parachute panel lies stretched out alongside the capsule, draped over clumps of brush and snowdrifts. A crew consisting of Hero of the Soviet Union Pilot-Cosmonaut USSR Aleksandr Viktorenko and French cosmonaut Michel Tanini is in the midst of its first field survival exercise.

Michel lives by the sea, in a warm coastal climate where, he tells us, in winter the temperature does not fall below +9 degrees Celsius. This French cosmonaut is now in his second year of becoming accustomed to the Russian winter. He is a young, vigorous, athletic individual. But it is one thing to trot from one's quarters over to the training building in a warm, fur-trimmed tanned-leather car coat, and another thing altogether to be in the woods at night in the tight confines of a recovery capsule.

The first order of business is to release the restraining straps and gain some freedom of action, although in a spacesuit the concept of freedom is quite relative. It is against regulations to exit the recovery capsule at night. The most one is permitted to do is to open the hatch and take a look outside at the landing site. This the cosmonauts did. Cold, fresh iar immediately streamed into the capsule. But it was necessary to preserve heat. The life support systems, including fans and regenerative breathing units, continue operating after landing. But storage battery capacity is limited, and the batteries must be saved for radio communications and the strobe beacon—the basic elements for a rapid recovery.

Getting themselves into a more comfortable position, the cosmonauts slowly removed their spacesuits, helping one another. This is a rather complicated exercise in a recovery capsule packed with instruments and equipment. Now that they have freed themselves from their restrictive spacesuits it becomes easier to breathe, and their bodies also can relax.

They dragged out flight suits and their survival kit. The latter contains everything essential for survival: warm clothing, food, water, communications gear and signaling devices. A special pistol will enable them to aimed-fire a signal flare, to protect themselves against large predators, and to obtain game. There is also a medical kit for providing self-administered and mutually-administered first aid. The first-aid kit container can be used as a frying pan or container for heating and boiling water. The portable emergency survival kit also contains waterproof/windproofed matches and dry fuel.

Time passed. Toward midnight it became colder inside the recovery capsule. The cosmonauts put on insulated suits before settling down for the night. They were tired, but nervous excitement caused by the unaccustomed environment prevented them from falling asleep. Aleksandr and Michel conversed, improving their knowledge of French and Russian respectively. In order to pass the time and become calm, they decided to play a game of chess. The courtesy light in the recovery capsule enabled them to see the portable chess set's miniature chessmen.

The temperature inside the recovery capsule was gradually dropping. The cosmonauts pulled out insulated jackets from the survival kit. They immediately began to feel sleepy. But both could not sleep at the same time. They had to stay awake in turns, in order not to miss the appearance of search and recovery helicopters or over-snow rescue vehicles. It was snowing heavily, however, and there was little chance of arrival of the recovery team.

Viktorenko took the night watch. Michel had a hard time falling asleep and opened his eyes from time to time. Aleksandr reassured him: everything is fine, you can go to sleep. Michel himself was fully aware of the fact that there was no reason for concern in this "field simulation" situation, for the recovery capsule was under continuous observation, although from some distance, by the team of instructors which was conducting the training exercise. But it was not very comfortable sleeping in cramped quarters surrounded by cold metal, even in a perfectly calm state. It was probably for this reason that the night dragged on so long and they were so happy to greet the dawn.

Peeping out through the opened hatch and determining that it was already fairly light outside, the cosmonauts climbed out of the recovery capsule and reconnoitered the area. The capsule lay in a forest glade. Snow which had fallen during the night had heavily dusted the capsule and the parachute. With such natural camouflage it was highly questionable whether even a search and recovery helicopter would be able to spot the capsule landing site. The capsule looked like a big snowdrift. It was necessary immediately to brush the snow off the capsule and the parachute and to spread a bright orange panel over the recovery capsule, making it as visible as possible.

Completing this task fairly quickly, the cosmonauts then decided to have a bite to eat. For breakfast they would have standard survival rations, including a number of high-calory items: freeze-dried cottage cheese, chocolate, and prunes. After the meal they readied flash signaling devices in case the recovery helicopters appeared overhead. From time to time they turned on the portable radio set and listened for radio communications. But it was not at all flying weather; it was unlikely that they would soon see the search and recovery team. Therefore, while it was still light, they proceeded to build an improvised overnight shelter. After all, the training program called for building a shelter with the parachute and field expedient means.

Under the parachute canopy, spread across the recovery capsule and stretched out by tying the suspension lines to bushes, the cosmonauts marked off a sleeping area by the capsule hatch. They cut out snow blocks with a machete, cutting a trench in the snow. They removed from the recovery capsule their spacesuits, contoured seats, and fabric from the capsule's interior lining. They laid all this out on the floor of the trench. The snow provided good insulation. On top of this they spread out a space-age plastic reflective survival blanket, the reflective surface of which keeps cold out and heat in. They then added rubber rafts and a multilayer bedsprread of parachute canopy to this "layer cake."

They lay down to rest and were reassured that their labors had not been in vain. Even on an overcast day the orange parachute-canopy roof overhead seemed to add light and comfort.

Night was approaching. Now they had to concern themselves with building a fire. Grabbing a machete and a wire saw, they headed out to look for firewood. Soon a small fire was crackling next to their shelter. This immediately perked up their spirits.

They had dinner. Michel switched on the radio to receive and dozed off. The little sleep they had gotten the previous night and the hard work they had done that day were having their effect.

Viktorenko checked the pistol to make sure it was ready to fire signal flares, and then checked to make sure that the radio was operating and tuned to the emergency frequency. He could hear nothing from the search and recovery teams. Aleksandr knew that special off-road vehicles for search and rescue operations were making their way through the bad weather and across the trackless terrain toward the landing site.

Titmice were calling back and forth somewhere nearby, and off in the distance the harsh chatter of a jay could be heard. Day was coming upon the forest. The cosmonauts crawled out of their shelter. They began preparing to head out on foot. They fashioned improvised backpacks out of parachute fabric. They filled them with emergency survival packs and essential gear. They secured the pistol and radio set to the gear where they could get at them immediately when needed. They helped each other put on their backpack and headed out into the natural clearing. The forest reverberated with a loud rumbling sound: all-terrain vehicles were approaching the "landing" site.

The exercise was over. The cosmonauts would be returning to Zvezdnyy Gorodok....

That night the recovery capsule and parachute canopy were moved to a new site deep in the forest. It would now be the home of another crew, consisting of Hero of the Soviet Union Pilot-Cosmonaut USSR Aleksandr Volkov and French cosmonaut Hero of the Soviet Union Jean-Louis Chretien. Both of them already knew the joy of space flight. The first Soviet-French mission continued, as it were, the traditions of friendship and fraternity which had been born during the harsh war years between the Russian and French fliers of the Normandie-Niemen Squadron.

During training for the first mission, Jean-Louis went through an exceptionally difficult training exercise at sea, during which the mutual understanding and friendship between the members of the Soviet-French crew were manifested particularly vividly. He said at the time: "If I were given the choice and asked with whom I would like to fly into space, I would reply: only with Russian cosmonauts."

During preliminary training Jean-Louis Chretien and Michel Tanini viewed a training film titled "Your Life Is In Your Hands," which showed cosmonaut procedures

in response to emergency situations. They also took part in practical training drills on snow-covered terrain in using emergency survival gear. And now they would be putting the acquired knowledge to a practical test.

Removing their spacesuits and changing clothes, they spent the first night in the capsule, fully experiencing all the discomfort of its confined space. After breakfast the following morning they proceeded to build a comfortable, warm shelter out of the parachute canopy and snowblocks, for they would be spending another night in the elements, and the forecast called for fairly low temperatures. But as long as the pale winter sun was in the sky, if one was sheltered from the wind the sun's rays were perceptibly warming. They worked calmly and in a measured rhythm. The shelter foundation was in place by midday. They built themselves a "three-room" snowblock-and-parachute dwelling. They built a campfire by the shelter entrance. They collected firewood in advance, in order not to have to look for wood in the forest at night. They periodically fired signal flares to indicate their location.

By nightfall they had built a warm, solid shelter. They insulated their legs and feet with strips of reflecting metal-foil space-age plastic blanket. Aleksandr Volkov had learned this trick during field training exercises in the North and was now applying it.

Jean-Louis, comfortably tucked away in the shelter, soon fell asleep. Aleksandr stood watch. Responsibility for the success of the exercise prevented him from relaxing and giving in to the desire to sleep. He raised the edge of the parachute canopy and peered out of the shelter. His face was lapped by the predawn cold. The sky was turning gray in the east. Morning was approaching, and the temperature was dipping to its lowest point. The effort they had expended on building the shelter had been fully repaid....

At sunrise they packed the requisite gear in their backpacks and proceeded out through the waist-deep snow toward the orange tents, where they would be given a medical examination.

Thus ended training and preparation for one of the possible endings of a manned orbital mission.

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